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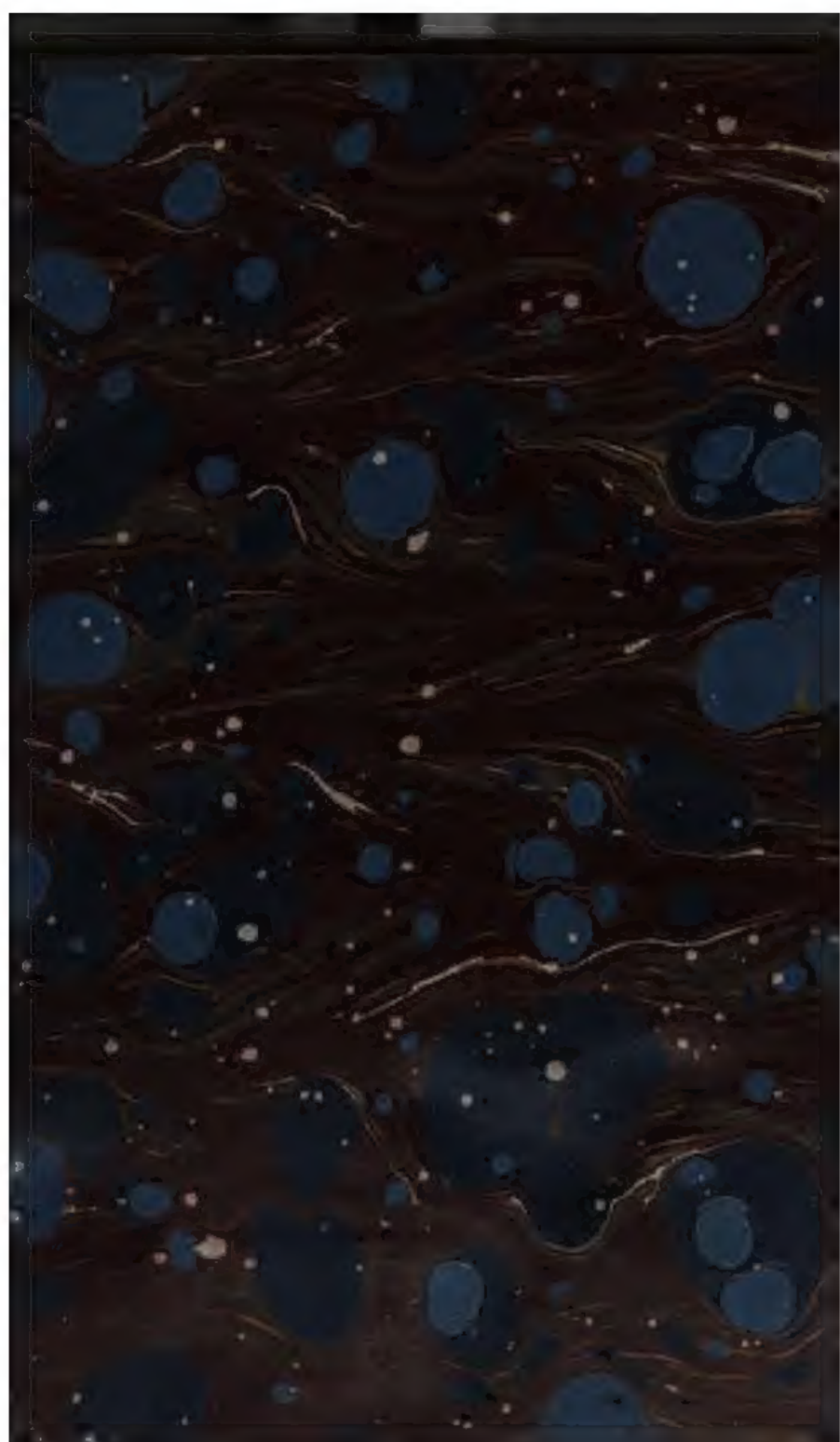
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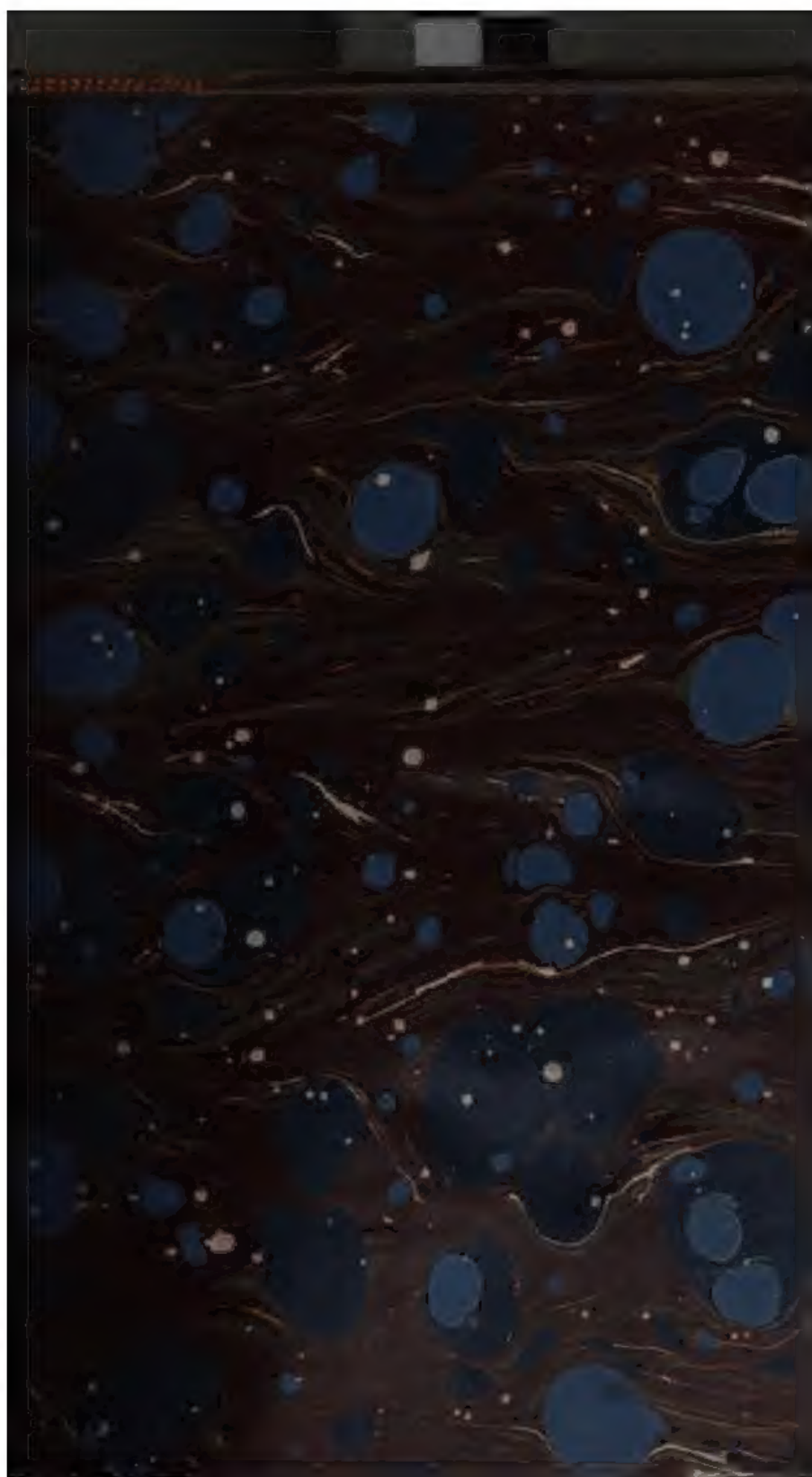
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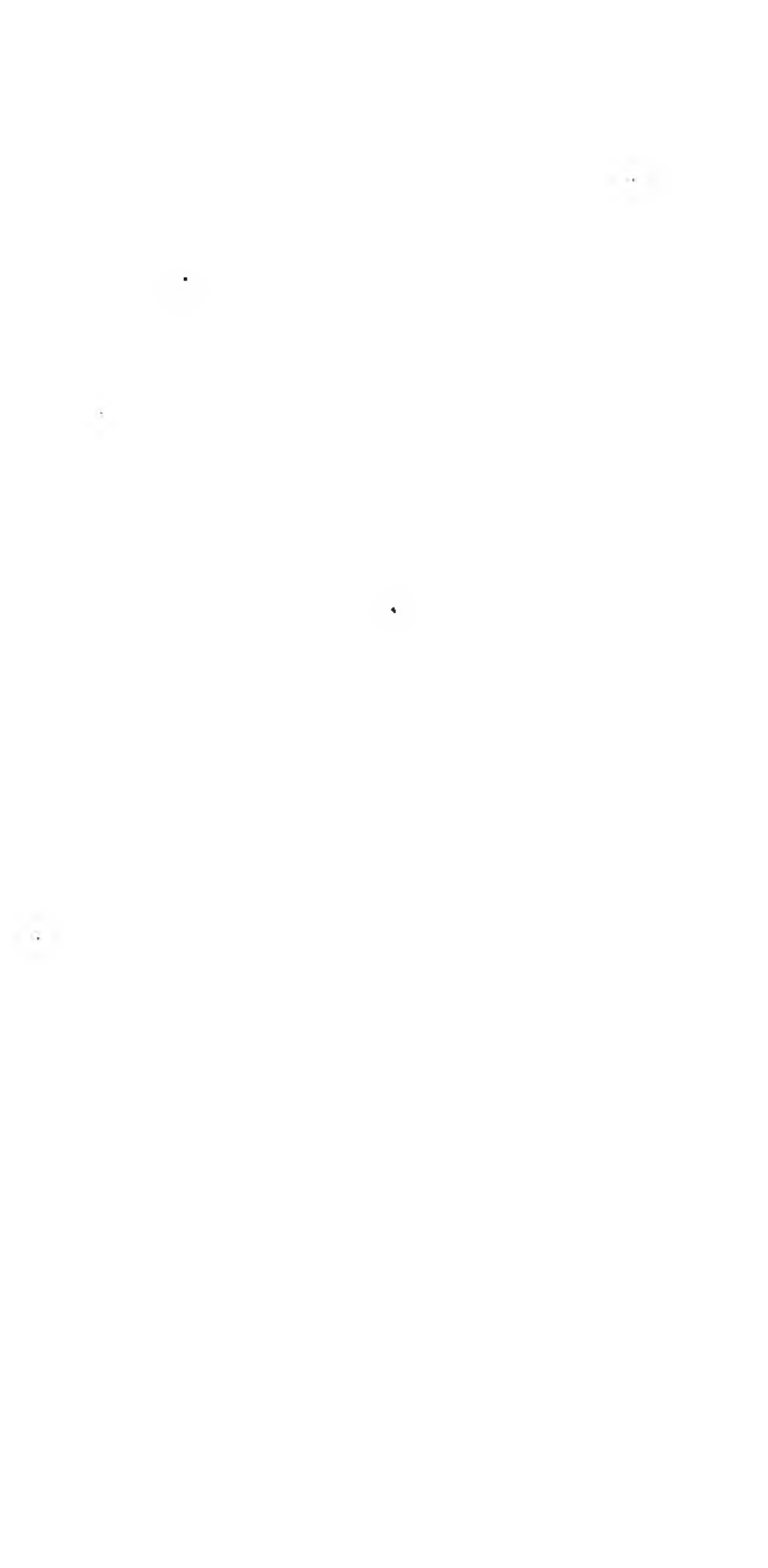


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THE
JOURNAL
OF THE
ROYAL GEOGRAPHICAL SOCIETY.

VOLUME THE THIRTY-SEVENTH.



1867.

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Royal Geographical Society,

1867.

REPORT OF THE COUNCIL,

READ AT THE ANNIVERSARY MEETING ON THE 27TH MAY.

THE Council have the pleasure of submitting the following Report of the financial state of the Society, and its general progress since the last Anniversary Meeting.

Members.—Since the last Report 147 Fellows have been elected, of whom 3 were Honorary Corresponding, and 19 have paid their Life Compositions. The number lost by death is 43, and by resignation 33.

In pursuance of the notice given in the last year's Report, and under the direction of the Finance Committee, the rule has been put in force with regard to Fellows whose subscriptions were three years and upwards in arrear; 45 names have thus been struck off the list, the accumulation of several years.

Finances.—The annexed Balance-sheet (A) shows a continuance of the financial prosperity of the Society, and compares favourably with those of previous years. It will be seen that the receipts for the year 1866 (exclusive of balance in hand) were 5085*l.* 8*s.* 3*d.*; in 1865 the amount was 4905*l.* 8*s.* 3*d.*; and in 1864, 4977*l.* 8*s.* 6*d.* The expenditure during the past year was 4052*l.* 15*s.*; in 1865 it was 4307*l.* 4*s.* 5*d.*; and in 1864, 3647*l.* 7*s.* 10*d.* Of the amount expended, 272*l.* 1*s.* 6*d.* were for the promotion of expeditions, the details of which are given

in the Balance-sheet. The excess of income over expenditure during the past year was 1032*l.* 13*s.* 3*d.*; and this has enabled the Finance Committee, on the approval of the Council, to add 1000*l.* to the funded property, purchasing India 5 per Cent. Stock to that amount, at the cost of 1028*l.* 15*s.* It may be well to state that since the end of the financial year, December 31st, 1860, 1000*l.* more have been invested in India 5 per Cent. Debentures. The total amount of the funded capital of the Society at the present date is 14,500*l.*

The legacy of 4000*l.* mentioned in the last Report as having been bequeathed to the Society by the late Benjamin Oliveira, Esq., is still under litigation. As before stated, the Council were recommended by their legal advisers to appear in the suit as defendants, the bill being filed in Chancery by members of the family, who set up a prior settlement of Mr. Oliveira. It is hoped that by the next anniversary the Council may be able to announce the conclusion of the suit with results satisfactory to the Society.

The system of monthly examination of the expenditure and accounts by the Finance Committee has been continued throughout the year, and all bills due by the Society have been paid at the next Monthly Meeting following their presentation. The accounts have also been examined by the Auditors to the end of the year 1860.

Report of the Council.

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STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to the 31st Dec. 1866.

STATEMENT showing the Progress of the INVESTMENTS of the Society from the Year 1832 to the 31st Dec. 1866.

Year.	Cash Receipts within the Year.			Cash Amounts invested in			Deducting Amounts Invested in Funds; actual Expenditure.			End of the Year, Dec. 31.	Cash invested.			Amount of Stock purchased.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.		£.	s.	d.	£.	s.	d.
1848	696	10	5	..	..	..	755	6	1	1832	3637	10	0	1000	0	0
1849	778	8	0	..	..	..	1098	7	6	1833	4130	0	0	1000	0	0
1850	1036	10	5	..	..	..	877	2	10	1834	4426	0	0	1000	0	0
1851	1056	11	6	..	..	..	906	14	7	1835	4426	0	0	1000	0	0
1852	1220	3	4	..	..	..	995	13	1	1836	4426	0	0	1000	0	0
1853	1917	2	6	..	..	..	1675	6	0	1837	4426	0	0	1000	0	0
1854	2565	7	8	..	..	..	2197	19	8	1838	4426	0	0	1000	0	0
1855	2594	7	0	..	..	..	2636	3	1	1839	4129	15	0	4500	0	0
1856	3372	5	1	533	10	0	2814	8	1	1840	3788	10	0	1100	0	0
1857	3142	13	4	378	0	0	3480	19	9	1841	2801	0	0	3150	0	0
1858	3069	15	1	..	..	..	2944	13	6	1842	2801	0	0	3150	0	0
1859	3471	11	8	950	0	0	3423	3	9	1843	2219	18	6	2578	4	4
1860	6449	12	1	466	17	6	5406	8	7	1844	2219	18	6	2578	4	4
1861	4792	12	9	1358	2	6	3074	7	4	1845	2219	18	6	2578	4	4
1862	4659	7	9	1369	7	6	3095	19	4	1846	1933	1	0	2578	4	4
1863	5256	8	3	1837	10	0	3655	4	0	1847	2193	1	0	2502	6	2
1864	4977	8	6	1796	5	0	3647	7	10	1848	1886	16	8	2224	1	10
1865	4205	8	3	1041	5	0	4307	4	5	1849	1886	16	8	2224	1	10
1866	5095	8	3	1028	15	0	4052	15	0	1850	1886	16	8	2224	1	10
										1851	1886	16	8	2224	1	10
										1852	1886	16	8	2224	1	10
										1853	1662	14	10	2000	0	0
										1854	1662	14	10	2000	0	0
										1855	1662	14	10	2000	0	0
										1856	2216	4	10	3000	0	0
										1857	2594	4	10	3000	0	0
										1858	2594	4	10	3000	0	0
										1859	3544	4	10	4000	0	0
										1860	4011	2	4	4500	0	0
										1861	5369	4	10	6000	0	0
										1862	6758	12	4	7500	0	0
										1863	8596	8	4	9500	0	0
										1864	10365	7	4	11500	0	0
										1865	11406	12	4	12500	0	0
										1866	12435	7	4	13500	0	0*

In 1856 a Treasury Grant of 1000*l.* for the East African Expedition received.

In 1860 a Treasury Grant of 2500*l.* for the East African Expedition received.

* Of which 2000*l.* is India 5 per Centa.

Publications.—The 36th volume of the Journal was published at the end of April last, and is now being delivered, as usual, to all Fellows who apply for their copies at the offices of the Society in Whitehall Place. The volume contains 21 Memoirs and 14 Maps, and it is hoped will bear comparison for the varied interest of its contents with those of preceding years.

The 10th volume of the Proceedings has also been published.

with correct bearings, can be drawn. The Diagrams of Asia and America were finished and exhibited early in the Session, and the Council have now the satisfaction to report the completion of the other two, namely, the Malay Archipelago and the World, the former of which is on a scale of 6 inches, and the latter of 0·63 in. to an equatorial degree.

Catalogue of Maps.—Considerable progress has been made during the past year in cataloguing the valuable collection of Maps which the Society possesses; and, under the direction of the Special Committee above named, the Curator, with an extra assistant, has made a complete list in MS. of all the Maps—giving the title, scale, date and limits of each. In future this will much facilitate the finding of any Map, to which a visitor may wish to refer. The Catalogue does not at present include charts, diagrams, models, and views, and is classified according to countries and places. An additional Catalogue might hereafter be made, in alphabetical order, of places represented, with the press mark of the Curator's list, and such simpler form of Catalogue might eventually be printed for the use of Fellows.

Grants to Travellers. A sum of 200*l.* was voted during the year to the Leachhardt Search Fund in Australia, and a further sum of 50*l.* to M. Gerhard Rohlfs, who, when last heard of, was about to leave the shores of Lake Tshad for Waday. A set of instruments were provided, at the cost of 22*l.* 1*s.* 6*d.*, for Mr. E. Whymper, who has lately left England to explore Greenland. Instruments have also been lent to Mr. Henry Whitely, a traveller who is now on his way to explore the eastern slopes of the Andes, in Southern Peru.

APPENDIX A.

BALANCE-SHEET FOR THE YEAR 1866.

Receipts.

Expenditure.

Receipts.	£.	s.	d.	£.	s.	d.	Expenditure.	£.	s.	d.
Balance in Banker's hands 31st Dec., 1865	86	15	3				Rent, Taxes, and House Expenses			443 12 8
Ditto Accountant's Ditto	12	9	7				Salaries and Wages ..			1213 15 6
Subscriptions of 1243 Fellows ..	2623	13	0	99	4	10	Library and Map-Rooms ..			113 1 9
Entrance Fees of 141 Fellows ..	423	0	0				Subscriptions, &c., returned ..			47 0 0
Life Compositions of 24 Fellows ..	595	0	0				Gold Medals, and other awards			177 6 0
Arrears of Subscriptions ..	194	0	0				Postages, &c. ..			131 19 8
Parliamentary Grant ..				3935	13	0	Office Expenses			283 9 6
Royal Premium (1865 and 1866) ..				500	0	0	Publications and Illustrations			1230 10 1
Sale of Publications ..				105	0	0	Furniture and Repairs ..			111 0 3
Advertisements ..				128	13	7	Expenditures:			
Rent of Stables ..				90	14	9	Contribution towards M. Gérard	50	0	0
Half Year's Dividend on 1000 <i>l.</i> India 5				10	0	0	Rohlf's Expedition ..			
per Centa. ..	24	11	8				" Leichhardt Search			
Half Year's Dividend on 11,500 <i>l.</i> New 3							Expedition ..	200	0	0
per Centa. ..	169	12	6				Mr. Whymper's			
Half Year's Dividend on 2000 <i>l.</i> India 6							Expenditure (Instruments) ..	22	1	6
per Centa. ..	49	3	4				Miscellaneous ..			
Half Year's Dividend on 11,500 <i>l.</i> New 3										273 1 6
per Centa. ..	169	12	6							28 19 6
Sundry small receipts ..										
				413	0	0	Addition to Funded Property (1000 <i>l.</i>)			4052 15 0
				2	6	11	India 5 per Centa. ..			1028 15 0
							Balance in Banker's hands ..	97	15	1
							Ditto Accountant's ..	15	8	0
										103 3 1
				£5184	13	1				£5184 13 1

REGINALD T. COCKS, Treasurer.

Audited 17th April, 1867.

THOMAS H. BROOKING,
G. BALFOUR,
CHARLES WHITE,
H. JONES WILLIAMS,

Auditors.

APPENDIX B.

ESTIMATE FOR THE YEAR 1867.

<i>Receipts.</i>				<i>Expenditure.</i>			
	£.	s.	d.		£.	s.	d.
Cash Balance, 1st Jan., 1867	103	3	1	Rent, Taxes, and House Expenses ..	..	..	550 0 0
Annual Subscriptions ..	2600	0	0	Salaries (whole Staff) and Wages ..	..	..	1250 0 0
Life Compositions ..	450	0	0	Library and Map-Rooms ..	..	..	250 0 0
Entrance Fees ..	300	0	0	Gold Medals ..	..	..	48 0 0
Arrears of Subscriptions ..	150	0	0	Postages, &c. ..	..	..	130 0 0
Royal Premium for 367 ..	52	10	0	Office Expenses ..	..	..	250 0 0
Parliamentary Grant ..	500	0	0	Journal, with Maps, and Proceedings ..	..	..	1000 0 0
Sale of Publications ..	125	0	0	Index to third ten vols. of the Society's Journal ..	..	..	200 0 0
Dividends and Small Receipts ..	480	0	0	EXPENDITURES:—	£.	s.	d.
				Contribution to M. Gérard Rohlfs' Expedition ..	..	..	50 0 0
				.. Livingstone Search do.	200	0	0
					250	0	0
					3926	0	0
				Balance available for investment ..	..	..	924 13 1
					£4850	13	1

Library Regulations.

I. The Library will be open every day in the week (Sundays excepted) from 10:30 in the morning to 4:30 in the afternoon,* except on New-Year's Day, Good Friday to Easter Monday inclusive, and Christmas week; and it will be closed one month in the year, in order to be thoroughly cleaned, viz. from the first to the last day of September.

II. Every Fellow of the Society is entitled (*subject to the Rules*) to borrow as many as four volumes at one time.

Exceptions :—

1. Dictionaries, Encyclopædias, and other works of reference and cost, Minute Books, Manuscripts, Atlases, Books and Illustrations in loose sheets, Drawings, Prints, and unbound Numbers of Periodical Works, *unless with the special written order of the President.*
2. Maps or Charts, *unless by special sanction of the President and Council.*
3. New Works before the expiration of a month after reception.

III. The title of every Book, Pamphlet, Map, or Work of any kind lent, shall first be entered in the Library-register, with the borrower's signature, or accompanied by a separate note in his hand.

IV. No work of any kind can be retained longer than one month: but at the expiration of that period, or sooner, the same must be returned free of expense, and may then, upon *re-entry*, be again borrowed, provided that no application shall have been made in the mean time by any other Fellow.

V. In all cases a list of the Books, &c., or other property of the Society, in the possession of any Fellow, shall be sent in to the Secretary *on or before the 1st of July in each year.*

VI. In every case of loss or damage to any volume, or other property of the Society, the borrower shall make good the same.

VII. No stranger can be admitted to the Library except by the introduction of a Fellow, whose name, together with that of the Visitor, shall be inserted in a book kept for that purpose.

VIII. Fellows transgressing any of the above Regulations will be reported by the Secretary to the Council, who will take such steps as the case may require.

By Order of the Council.

* On Saturday the Library is closed at 2:30 P.M.

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1868.

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	PHILIPPI, Dr. Rodolfo Armando .. Chill
	PLATEN, His Excellency Count.

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RAFUELI, Count Annibale Bologna	
RÜPFEL, Dr. E., For. M.L.S... Frankfort	
SALAS, Don Saturnino, Pres. Topo. Depart., Argentine Repub. Buenos Ayres	
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SOLDAN, Don Marino Felipe Paz, Lima, and 21a, Hanover square, W.	
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STUVE, Prof. Otto, Imp. Observ. of Pulkowa St. Petersburg	
	SYDOW, Lt.-Col., Emil von (Chief of the Geographical Department of the Staff of the Prussian Army), Behren Straase, 68, Berlin
	TCHIHATCHEF, M. Pierre de .. Paris
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	VANDER MARLEN, Mr. Ph. .. Brussels
	VERNEUIL, M. E. de Paris
	VILLAVICENCIO, Don Manuel Guayaquil
	WRANGELL, Admiral Baron, St. Petersburg
	ZIEGLER, M. J. M. Winterthur

FELLOWS.

(TO 11TH JANUARY, 1868.)

N.B.—Those having * preceding their names have compounded for life.

Year of Election.	
1863	Abdy, Rev. Albert, M.A. Worcester Coll., Oxford; and Streatham.
1860	A Beckett, Arthur M., Esq., F.R.C.S.E.
1851	Abinger, W. F. Scarlett, Lord. Guard's Club, S.W.
1865	Acheson, Frederick, Esq., C.E. 7, College-hill, Highbury-park, North, N.
1861	Acland, J. Barton Arundel, Esq. Mount Peel, Canterbury, New Zealand. Care of A. Mills, Esq., 34, Hyde-park-gardens, W.
1853	Acland, Sir Peregrine Palmer F. P., Bart. Fairfield, Somerset.
1830	*Acland, Sir Thomas Dyke, Bart., F.R.S. 34, Hyde-park-gardens, W.; and Killerton, Exeter, Devon.
1867	Adair, Col. Alex. Shafte. 7, Audley-squares, W.
1867	Adare, Viscount. Clearwell-court, Coleford, Gloucestershire.
1861	10 Addington, Right Hon. H. U. 78, Eaton-place, S.W.
1862	Addison, Col. Thomas, C.B.
1859	Ainslie, Col. H. Francis. Junior United Service Club, S.W.; and Burlington-chambers, 180, Piccadilly, W.
1810	*Ainsworth, W. Francis, Esq., F.S.A. Ravenscourt-villa, New-road, Hammersmith, W.
1859	Airlie, David Graham, Earl of. Holly-lodge, Kensington, W.
1860	Aitchison, David, Esq. 180, Piccadilly, W.
1830	*Albemarle, George Thomas, Earl of. 11, Grosvenor-square, W.; Quiddculham-hall, Lavingford, Norfolk; and Elvedon-hall, Suffolk.
1862	Alcock, Sir Rutherford, K.C.B. Athenæum Club, S.W.
1838	*Aldam, William, Esq. Frickley-hall, near Doncaster.
1865	Aldom, Joseph B. Esq., M.A., PH. DR. Sawney-house, Leyton, Essex.
1837	20 Aldrich, Captain Robert D., R.N. Windmill-road, Croydon, Surrey, S.
1830	Alexander, Colonel Sir Jas. Ed., K.C.L.S., F.R.S.E., F.R.S.E., etc., 14th Regt. United Service Club, S.W.; and Westerton-house, Bridge of Allan, N.D.
1864	Allan, C. H., Esq. Lloyd's, E.C.; and 31, Park-street, Stoke Newington, N.
1857	Allan, G. W., Esq. Moss Park, Toronto, Canada.
1855	Allen, Jas., Esq. 122, Leadenhall-street, E.C.
1867	Allen, Alderman Wm. F. (Lord Mayor of London). Mansion-house, E.C.

Year of Election

- 1845 Allen, James Pearce, Esq. 18, Waterloo-place, S.W.
 1854 Ancon, J. Esq. 8, John-street, Adelphi, W.C.
 1863 Anderson, John Edmund, Esq. *House Hunter, Taunton Somerset.*
 1867 Anderson, Arthur, Esq. *Novices-house, Norwood, S.*
 1867 30 Anderson, Sir Henry L., Esq. *Indo-office, S.W.*
 1868 Anderson, James, Esq. 1, Biffiter-court, City, E.C.
 1868 Anderson, John, Esq. Messrs. W. L. Adamson and Co. *Shanghai. Care of Messrs. Jno. Burd and Co., Hong Kong. Per Messrs. Adam, Thomas, and Co., 46, Lime-street, E.C.*
 1868 *Anson, Col. W., Esq. 18, Gloucester-square, Hyde-park, W.
 1868 *Andrew, William P., Esq.
 1867 Andrews, G. H., Esq. *The Colaba, Aric Frankfurt.*
 1866 Andrews, John R., Esq. *East-hill house, Wandsworth, S.W.*
 1866 Annesley, Col. the Hon. Hugh, Esq. 25, Norfolk-street, Park-lane, W.
 1867 *Anson, Sir John William Hamilton, Bart. 35, Portland-place, S.W.; and *Shirley-house, Croydon.*
 1868 Ansted, Prof. D. T., M.A., F.R.S., etc. 38, Brunswick-square, W.C.; *Attenium Club, S.W.*; and *B-nar St. Martin, Guernsey.*
 1867 40 Anstruther, M. Gen. Philip, J.D., Madras Artillery.
 1868 Anstruther, Lieut. R. L., Belle Brigade, Montreal, Canada. *Care of Lt.-Col. L. Anstruther, Hantsdown-hall, Ipswich.*
 1868 *Antrobus, Sir Edmund, Bart. 14b, Piccadilly, W.; *Lower Chesham, Bucks, Surrey; and Amesbury, Wilt.*
 1868 Arber, Edward, Esq., A.M.C. *Admiralty, W.C.*; *Crut. Scotic Club, S.W.*
 1868 Armitage, George, Esq. 23, Hyde-park-gardens, W.
 1868 Arbuthnot, Lieut. George, R.N.A. *Cumworth, Sunnyhills.*
 1868 Arrol-John, Andrew, Esq. 35, Albemarle-street, W.
 1868 Archer, Graves Thus., Esq. 1, Emsmore-place, Finsbury-square, S.W.
 1868 Aronson, The Marquis de Grammont. *Casa Primi, Paris. Care of Mr. Hecard Quarech, 15, Piccadilly, W.*
 1868 *Arden, Richard Edward, Esq. *Simbury-park, Middlessex, S.W.*
 1868 50 *Armistead, Rev. Charles John, M.A., F.R.S. *University Club, S.W.*; *National Club, S.W.*; and *Withall-rectory, near Louth, Leicestershire.*
 1868 Armistead, Gen., Esq. *Lord Clark, Fern, N.H.*
 1868 Armitage, Edward, Esq. 5, Hall-road, St. John's-wood, N.W.
 1867 Armstrong, Alexander, Esq. M.D., M.B., F.R.C.P., Deputy Inspector-General. *Royal Melville Hospital Chatham. Junior United Service Club, S.W.*
 1868 Arnes, Philip York, Earl of. *Fashion-house, Hans-place, Strand-street, S.W.* and *Swand-cour, Warford, Ireland.*
 1868 *Arrowood, John, Esq., F.R.S. 35, Hereford-square, Old Brompton, S.W.
 1868 Arthur, John, Esq. 8, Nottingham-square, W.
 1868 Arthur, Captain William, R.N. *The Priory, Loughborough.*
 1868 Ashburn, Lord *Bath-house, Piccadilly W.*
 1868 *Ashton, R. J. Esq. *Hutton-cour, Threxton-street E.C.*
 1868 60 *Ashwell, James, Esq., M.A., F.R.S.

Royal Geographical Society.

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Year of
Election.

- 1851 Astley, Francis D. P., Esq., M.R.I. 67, *Eaton-square, S. W.*
- 1850 * Atkins, John Pelly, Esq., F.R.S. *Halsted-place, near Sevenoaks.*
- 1860 Attwell, Professor Henry. *Barnes, S. W.*
- 1859 Austen, Capt. Henry H. Godwin, 24th Foot, Trig. Survey, Panjab. *Junior United Service Club, S. W.; and Chilworth-mansion, Guildford, Surrey.*
- 1863 Austin, John G., Esq.
- 1854 Ayrton, Acton S., Esq., M.P. 3, *Essex-court, Temple, E. C.*
- 1845 * Ayrton, Frederick, Esq.
- 1866 * Babington, William, Esq., 23, *Fulham-place, Maida-hill, West, W.; and Boney River, West Coast of Africa.*
- 1836 * Back, Admiral Sir Geo., D.C.L., F.R.S. 109, *Gloucester-place, Portman-sq., W.*
- 1863 70* Backhouse, John Henry, Esq. *Dartington.*
- 1866 Bacon, Geo. Washington, Esq. 48, *Paternoster-row, E. C.; and 73, Pentonville-road.*
- 1864 Badger, Rev. Geo. P. 7, *Dawson-place, Baywater, W.*
- 1863 Bagot, Christopher N., Esq. *Oriental Club, W.*
- 1862 Bagot, Capt. L. H. *Care of C. S. Bagot, Esq., 40, Chancery-lane, W. C.*
- 1859 Bailey, L. C., Esq., Staff Commander, R.M. *Topographical Department, New-street, Spring-gardens, S. W.*
- 1857 Baillie, Major John, Bengal Staff Corps. 22, *Palace-gardens-terrace, Kensington, W.*
- 1862 Baillie, John B., Esq. *Lays-castle, Inverness.*
- 1861 Baillie, William Henry, Esq. 12, *Chapel-street, Belgrave-square, S. W.*
- 1857 Baines, Thomas, Esq., 15, *Northumberland-street, W. C.*
- 1861 80* Baker, John, Esq.
- 1862 Baker, Capt. Robert B. *Oriental Club, Hanover-square, W.*
- 1865 Baker, Sir Samuel White. *Hadenham-hall, Bungay, Norfolk.*
- 1855 Baker, Capt. Wm. T., 85th Regt. *Junior United Service Club, S. W.; and 31, Grosvenor-place, Bath.*
- 1861 Baldwin, William Charles, Esq. *Leyland-vicarage, Preston.*
- 1861 Balfour, David, Esq. *Balfour-castle, Kirkwall, N. B.*
- 1847 Balfour, M.-General George, R.A., C.B. 27, *Gordon-street, Gordon-square, W. C.; and Oriental Club, Hanover-square, W.*
- 1853 Balfour, John, Esq. *New South Wales; and Colinton, Queensland; 39, St. James'-street, S. W.*
- 1863 Balfour, John Osborn, Esq. 7, *The Common, Woking.*
- 1863 Balfour, William, Esq. 16, *Paragon, Ramsgate.*
- 1860 90 Ball, John, Esq. *Oxford and Cambridge Club, S. W.*
- 1863 Bamforth, Rev. J., Principal of Doveton College. *Madras. Care of Messrs. Jackson, Walford, and Hodder, 27, Paternoster-row, E. C.*
- 1852 Bencroft, Capt. W. C., 16th Regt. *Aide de Camp and Military Sec., King's House, Jamaica; McGregor and Co., Charles-street, S. W.*
- 1862 Banks, George F., Esq., Surgeon R.M.
- 1858 Beanesman, Sir Alexander, Bart. *Crimmonogate, Aberdeenshire.*

Year of
Election

- 1840 *Barclay, Arthur Kett, Esq., F.R.S. *Park-street, Southwark, S.E.; and Bury Hill, Dorking, Surrey.*
- 1863 Barford, A. H., Esq., M.A. 1, *Cornwall-terrace, Regent's-park, N.W.*
- 1863 Baring, the Hon. Alexander, C.
- 1863 *Barling, John, Esq. *Outwood, Chichester.*
- 1864 *Barling, Thomas, Esq., M.P. 41, *Upper Grosvenor-street, W.*
- 1862 100 Barlee, Frederick Halgrave, Esq. *Care of G. Lawrence, Esq., 9, Old Broad-street, E.C. Perth, Western Australia.*
- 1864 Barnett, H. C., Esq. *Care of Alex. Whytock, Esq., 9, George-st., Edinburgh.*
- 1858 Barratt, James, Esq. *Lynnhall, near Herrington, Cheshire.*
- 1859 Barrington, Lord. 13 *Portford-street, Mayfair, W.*
- 1867 Barrington Ward, Maria J., Esq. *Magistrate-hall, Oxford.*
- 1859 Barron, John, Esq., F.R.S., F.S.A. 17, *Hamover-terrace, Regent's-park, N.W.*
- 1864 Barry, Alfred, Esq.
- 1857 Bartholomew, John, Esq. 4, *North-bridge, Edinburgh.*
- 1861 Bastlett, Herbert Lewis, Esq. *Union Club, S.W.*
- 1862 Barton, Alfred, Esq., M.D. *Oriental Club, W., and Hampton Court.*
- 1864 110 Baxter, Capt. J. P., R.N. 100, *Holgrave-road, S.W.; Messrs. Goudry & Co., Parliament-street, S.W.*
- 1837 *Bateman, James, Esq., F.R.S., L.S. *Kingsley-hall, Staffordshire.*
- 1850 Bateman, John F., Esq., Q.E. 16, *Great George-street, Westminster, S.W.*
- 1866 Bates, Henry Walter, Esq., F.R.S. 15, *Whitehall-place, S.W.*
- 1868 Bateman, George, Esq. 45, *Green-street, Fenchurch-lane, W.*
- 1860 Batten, John H., Esq. *Rosemont, Penzance; and Oriental Club, Hammer-square, W.*
- 1864 Bax, Capt. Henry G. 2, *Summer-place, Hyde-park-gardens, W.*
- 1867 *Baxter, Sir David, Bart. *London; 5, Moray-place, Edinburgh; and Hamarion-castle, Inver, Fife.*
- 1867 Baxter, Richard, Esq. (Barrister-at-Law). 19, *Leinster-gardens, Baywater, W.*
- 1853 Bazouhale, Joseph H., Esq. 14, *Chester-terrace, Regent's-park, N.W., and Scott's bridge, near Buckenbury, Herts; Chisle Inn, Wood-street, E.C.*
- 1867 115 Bayley, Chas. Jno., Esq., C.B., &c. 51, *Portico-road, Kensington, W.*
- 1863 Bayly, H. Esq. *Elm Grove-park, Kent.*
- 1862 Bayle, Lieut.-Col. John, R.E. *Admiralty Surrey Office; 131, St. George's-road, Finsbury, S.W.*
- 1862 Baynes, Lieut.-Col. R. Stuart. *Army and Navy Club, S.W.; and 38, Serpentine-street, S.W.*
- 1868 Beaumont, Captain H. H., R.N. 9, *Adelphi-place, S.W.*
- 1852 Beardmore, Nathaniel, Esq. Q.E. 30, *Great George-street, Westminster, S.W.*
- 1854 Beaumont, Aubrey de Vere, Esq. *Archibute, Co. Bristol.*
- 1854 Beaumont, William Morris, Esq., Bengal Civil Service. *Bengal.*
- 1850 Beaumont John Aug., Esq. *Wimbledon-park-house, Wimbledon, S.W.; and 60, Regent-street, W.*
- 1851 *Beaumont Westworth B., Esq., M.P. 144, *Piccadilly, W.; Eyre-street, Newcastle-upon-Tyne; and Brompton-park, Wakefield.*

Year of
Death.

- 1863 130 Beavan, Hugh J. C., Esq., F.A.S.L. 13, *Blandford-square, Regent's-park, N. W.*; 4, *Middle-temple-lane, E.C.*; and *Junior Carlton Club, S. W.*
- 1867 Beazeley, Alexander, Esq., O.R. *Engineers' Office, Trinity-house, E.C.*
- 1867 Beazeley, Michael, Esq., M.I.C.E. *Trinity Works, Penzance, Cornwall.*
- 1865 Bebb, Horatio, Esq. 13, *Gloucester-place, W.*; and *Leamington.*
- 1861 Beckett, James F., Esq., Staff Commander, R.N., F.R.S.A. 6, *Boyne-terrace, Notting-hill, W.* *Care of Captain George.*
- 1838 *Beckford, Francis L., Esq. *Ruxley-lodge, Esher, Surrey.*
- 1858 Bedford, Capt. G. Augustus, R.N. 5, *Ormond-terrace, Regent's-park, N. W.*
- 1860 Boston, Samuel Orchard, Esq.
- 1861 *Begbie, James, Esq. 27, *Mark-lane, E.C.*
- 1860 Begbie, Thomas Stirling, Esq. 4, *Mansion-house-place, E.C.*
- 1846 140 Bels, Charles Tiltstone, Esq., F.R. DR., F.R.A., &c. *Behestowne-house, near Canterbury.*
- 1853 Belcher, Rev. Brymer. *St. Gabriel's, Pimlico, S. W.*
- 1830 *Belcher, Vice-Adm. Sir Edward, K.C.B., F.R.A.S. 22a, *Connaught-square, W.*
- 1848 Beldan, Edw., Esq. 1, *Stone-buildings, Lincoln's-inn, W.C.*; and *Royston, Herts.*
- 1863 Belmore, The Earl of. *Dover-street, Piccadilly, W.*
- 1863 *Bell, Charles, Esq. *Richmond.*
- 1858 Bell, C. Davidson, Esq., Surveyor-General, Cape of Good Hope. *Cape Town. Care of the S. A. Pub. Library, Cape Town. Per Messrs. Smith, Elder, and Co.*
- 1860 *Bell, James Christian C., Esq. 42, *Westbourne-terrace, W.*; and 15, *Angel-court, Throgmorton-street, E.C.*
- 1848 Bellamy, Edward, Esq. 10, *Duke-street, St. James's, S. W.*
- 1848 *Bennett, John Joseph, Esq., F.R.S. *British Museum, W.C.*
- 1847 150 Bennett, J. Rindon, Esq., M.D. 15, *Finchbury-square, E.C.*
- 1848 *Benson, Robert, Esq. 16, *Craven-hill-gardens, Bayswater, W.*
- 1856 *Benson, William, Esq., Barrister-at-Law. 16, *Craven-hill-gardens, Bayswater, W.*
- 1830 Bentham, George, Esq., Pres. L.S. 25, *Wilton-place, S. W.*
- 1833 Bantley, Richard, Esq. *New Burlington-street, W.*
- 1859 Berens, H. Hulze, Esq. *Sidcross, Foot's Cray, Kent.*
- 1861 Berkeley, George, Esq., C.E. 24, *Great George-street, S. W.*
- 1865 Bernard, P. N., Esq. 8, *Finch-lane, E.C.*
- 1866 Berridge, F., Esq. *Winchester-house, Winchester-road, Adelaide-road, N. W.*
- 1848 Barry, Josiah, Esq. 16, *Regent-square, W.C.*
- 1863 160 Best, William, Esq. *Felpham, Sussex.*
- 1847 Bethune, Alexander M., Esq. *Otterburn, Hamlet-road, Upper Norwood; and 122, Loaden-hall-street, E.C.*
- 1842 *Bethune, R.-Adm. C. R. Drinkwater, C.B. 4, *Cromwell-rd., South Kensington, W.*
- 1864 *Betts, E. L., Esq. *Preston-hall, Maidstone, Kent.*
- 1848 Betts, John, Esq. 115, *Strand, W.C.*
- 1866 Bevan, William, Esq. 8, *Cedars-road, Clapham-common, S.*
- 1862 Bicker-Caarten, Peter, Esq. 30, *Northumberland-place, Bayswater, W.*
- 1866 Bicknell, Algernon S., Esq. 37, *Onslow-square, S. W.*

Year of Election	
1860	Biddor, G. Parker, Esq., C.E. 24, St. George st., S. W.; and Mitham, Surrey, S.
1865	Biswell, Charles Toth Esq. Garrick Club 85, Arno-st., Covent Garden, W.C. and 24, Grosvenor-st., Eaton-sq., S. W. Care of John Bulwell, Esq., Foreign Office.
1868	170 Biggs, Thos., Esq. Grosvenor-house, Abbey-road, Kent.
1859	Biggs, Frederick W., Esq. Dedden-hall, St. John Walden.
1850	Bigsby, John J., Esq., M.D. 80, Gloucester-place, Portman-square, W.
1864	Bingham, P. Esq. Athenaeum Club, S. W.
1858	Birch, Augustus F., Esq., M.A.
1880	Birch, H. W., Esq. 46, Welbeck-street, Cavendish-square, W.
1858	Birch, John Wilson, Esq. 20, New Broad-st., F.C., and 27, Cavendish-sq., W.
1859	Birch, Capt. Thomas, R.N. United Service Club, S.W.
1862	*Birdall, Capt. B. H. H. St. Stephen's, Bedford, near Hounslow.
1867	*Birchall, Henri Louis, Esq. 7, Grafton-street, New Bond-street, W.
1858	188 Bishop, George, Esq., R.N.A.S. Essex Club, S.W., and The Meadows, Twickenham S.W.
1861	Bishop, James, Esq. 11, Portland-place, W.
1867	Bisson, Frank S. de Carteret Esq. Hunt. R.M.S. 70, Horners-street, W.
1836	*Blasow, William H., Esq., M.A., F.R.S., F.R.S.E., Beckenham, near Uxbridge, Surrey.
1860	*Black Francis, Esq. 6, North-church, Edinburgh.
1867	Black, Thomas, Esq., Superintendent P. and O. Steam Navigation Company's Dockyard, Chiswick-place Southwark.
1858	Blackett Henry, Esq. 19, Great Marlborough-street, W.
1849	Blackie, W. Graham, Esq., FR. DR. 38, Frederick-street, Glasgow.
1861	*Blackney, William, Esq., R.N. Hydrographic office, S.W.
1862	*Blackstone, Frederick Elliot, Esq., R.C.L. British Museum, W.C.
1854	190 Blaine, D. Ingham, Esq., Barrister at Law 2 Paper-buildings, Temple, I.C. and 8, Southwick place, Hyde-park-square, W.
1857	*Blake, Wolstanton, Esq. 8, Devonshire-place, W.
1859	Blakelock, Capt. Alex., R.A.
1857	Blackman, Captain Thomas, R.A. 28, Wellington-street, Wandsworth, S.E.
1830	*Blackman, Henry, Esq., F.R.S.E.
1861	*Blackman, Henry, Esq. 78, Westminster-terrace, W.; and 55, Chancery-lane, W.C.
1857	Blackman, Richard, Esq. Fairfield, Lymington, Hants.
1867	Blackman, H. H., Esq., M.D. Toulouze, near Winchester.
1854	Blackmore, W. Robert, Esq. The Hook, London.
1861	Blackman, William, Esq. Adlestree, Surrey.
1839	200*Blewitt, Octavina, Esq. 4, Adelphi-terrace, Strand, W.C.
1864	Bliss, Edward, Esq., M.C. 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Year of Election	
1863	Boileau, Sir John P., Bart., F.R.S. 20, <i>Upper Brook-street, W.</i>
1860	Bollaert, William, Esq. 21A, <i>Hanover-square, W.</i>
1862	Bolton, Capt. Francis John, 13th Regt. <i>Chatham.</i>
1861	210 Bompas, George Cox, Esq. 15, <i>Stanley-gardens, Kensington-park, W.</i>
1864	Bons, John William, Esq., B.A., F.R.S.L., F.R.S. 42, <i>Bedford-square, W.C.</i>
1861	Bonney, Charles, Esq. <i>Adelaide, Australia.</i>
1858	Bonnar, George, Esq. 49, <i>Pall-mall, S.W.</i> ; and 2, <i>Baywater-terr., Kensington-square, W.</i>
1865	Bonwick, James, Esq. <i>St. Kilda, Melbourne.</i> Care of W. Beddow, Esq., 22, <i>South Audley-street, W.</i>
1866	Booker, Wm. Lane, Esq. Care of F. B. Alston, Esq., <i>Foreign Office.</i>
1859	Borough, Sir Edward, Bart. 4, <i>Nassau-street, Dublin.</i>
1845	*Borror, Dawson, Esq. <i>Albmont Ballon, Co. Carlow, Ireland.</i>
1856	*Botcherby, Blackett, Esq., M.A. 48, <i>Brompton-row, S.W.</i>
1858	*Botterill, John, Esq. <i>Flower-bank, Burley-road, Leeds.</i>
1860	210 Boustead, John, Esq. 34, <i>Craven-street, Strand, W.C.</i>
1861	*Boucher, Emanuel, Esq. 12, <i>Oxford-square, Hyde-park, W.</i>
1865	Bouvier, P. P., Esq. 16, <i>Hill-street, Berkeley-square, W.</i>
1855	Bovet, Charles, Esq. 135, <i>Camden-road, N.W.</i>
1867	Bowell, Wm., Esq., M.C.P. <i>Gate-house Grammar-school, Hereford.</i>
1861	*Bowen, Charles Christopher, Esq. <i>Christchurch, Canterbury, New Zealand.</i> Care of A. O. Ottysell, Esq., 16, <i>Charing-cross, S.W.</i>
1854	*Bowen, Sir George Ferguson, K.C.M.G., M.A. <i>Governor of Queensland, Australia.</i>
1866	Bower, Anthony Maw, Esq. 8, <i>Rochester-road, Camden-town, N.W.</i>
1862	Bowie, John, Esq. <i>Conservative Club, S.W.</i>
1833	Bowles, Admiral Sir William, K.C.B. 8, <i>Hill-street, Berkeley-square, W.</i>
1861	230 Bowman, John, Esq. 9, <i>King William-street, E.C.</i>
1865	Bowring, John, Esq. <i>Larkbeere, Exeter.</i>
1866	Bowring, Samuel, Esq. 1, <i>Westbourne-park, W.</i>
1862	Boyes, Rev. W. B., Secretary to Wesleyan Missionary Society. 38, <i>Milner-square, Islington, N.</i> ; and <i>Wesleyan Mission House, Bishopgate-street, E.C.</i>
1866	*Boyd, Edward Lennox, Esq., F.R.S. 35, <i>Cleveland-square, Hyde-park, W.</i>
1865	Boyle, Frederick, Esq. <i>The Firs, Bebington, Cheshire.</i>
1856	Boyne, G. Hamilton-Russell, Viscount. 22, <i>Belgrave-square, S.W.</i> ; <i>Brancepeth-castle, Durham</i> ; and <i>Burcarton-hall, Ludlow, Salop.</i>
1861	Bracebridge, Charles Holte, Esq. <i>Atherstone, Warwick.</i>
1862	Braithwaite, Isaac, Esq. 68, <i>Old Broad-street, E.C.</i>
1861	*Bramley-Moore, John, Esq. <i>Langley-lodge, Gerrard's Cross, Bucks.</i>
1850	240*Brand, James, Esq. 109, <i>Fenchurch-street, E.C.</i>
1867	Brandis, Dr. D., F.L.S. <i>Director of Forests, Calcutta.</i> Care of W. H. Allen, Esq., 13, <i>Waterloo-place, S.W.</i>
1860	Brassey, T., Esq. 4, <i>Great George-street, S.W.</i> ; and 56, <i>Lowndes-square, S.W.</i>
1850	Braybrooke, Philip Watson. <i>Assistant Colonial Secretary, Ceylon.</i> Messrs. <i>Price and Co., Craven-street.</i>

Year of
Election.

- 1841 *Bronckley, Julius, Esq. *Oxford and Cambridge Club, S.W.; and Mispate, near
Mansions, Kent.*
- 1842 Breerton, Rev. C. D., M.A. *Little Massingham, Hougham, Norfolk.*
- 1843 *Breerton, Rev. John, LL.D., F.R.S. *Bedford.*
- 1844 *Breton, Am. Henry, Esq. *Commandant R.N., M.R.I., 13, Camden-crescent, Bath.*
- 1845 Brett, Charles, Esq. *44, Cleveland-square, W.*
- 1847 Bridgo, John, Esq. *Abrachuan, Glamorg.*
- 1848 250 Bridges, Nathaniel, Esq.
- 1849 *Brierly, Oswald W., Esq. *8, Edlington-pl., Harrington-st., Hunsington, N.W.*
- 1850 Broughton, Major, J. P. *London, Ladbroke, Bedford, N.D.*
- 1851 *Brown, Sir Charles T., M.P., F.R.S. *6, Westonsandwich-chambers, Victoria-street,
W.; and 69, Lancaster-gate, W.*
- 1852 Brown, James, Esq., M.D. *12, Wellington-square, Cheltenham.*
- 1853 Brown, Major Frederick R. *Army and Navy Club, S.W.; Bengal, F. India.
Care of Mrs. F. Drake, Edgworth, Torquay.*
- 1856 Deane, Commander Leakey, M.D. *Army and Navy Club, S.W.; H.M.S.
"Hercules," Mediterranean.*
- 1857 Bristowe, Henry Esq.
- 1858 Broadwater, Robert, Esq. *3, Ladbroke-square, Fenchurch-street, E.C.*
- 1859 Broad, H. S., Esq. *27, Pembroke-square, W.*
- 1860 260 Brown, Walter, Esq. *15, Delamere-terrace, Hyde-park, W.*
- 1861 Brown, William, Esq. *Eastbourne, Sussex.*
- 1862 *Brocock, George C., Esq. *32a, Mount-street, W.*
- 1863 Brooks, Sir James, K.C.T., D.C.L. *Barrister, Horsham-bridge, S. Essex; Alderman
Chas. & W., and Surmote, Devon.*
- 1864 *Brooke, Sir Victor A., Bart. *Colborne-park, Co. Fermanagh, Ireland.*
- 1865 Brooks, Thomas, Esq. *Malden-street, Ealing, W.*
- 1866 *Brookings, George Thomas, Esq. *2a, Sussex-parade, Hyde-park, W.*
- 1867 *Brookings, Maximilian East, Esq. *11, Montagu-place, Bryanston-square, W.*
- 1868 *Brookings, Thomas Holbrooke, Esq. *1a, New Broad-street, City, E.C.; and
5, Norfolk-crescent, Hyde-park, W.*
- 1869 *Brooking, William, Esq. *Broadwater, Devon, Cambridge-Wells.*
- 1870 260 Broughton, John, Lord, G.C.B., M.A., F.R.S. *42, Berkeley-square, W.; and
Lestock-park, Westbury, Wilt.*
- 1871 *Brown, Daniel, Esq. *The Elms, Larkhall-terrace, Clapham, S.*
- 1872 Brown, Edwin, Esq. *F.R.S. Boston-on-Trent.*
- 1873 Brown, Lieut. H. Wilson, Esq. *Victoria, Vancouver Island, British Columbia
Care of H. C. Repton, Esq., 5, Horse-churchyard, E.C.*
- 1874 Brown, James, Esq., M.P. *Bosington, Yorkshire.*
- 1875 Brown, Jas. P., Esq. *The Limes, Care of Mr. Chas. Williams, 25, Foulney, E.C.*
- 1876 *Brown, James R., Esq., F.R.S. *Copenhagen. 5, Lymington-chambers,
Lancaster-place, W.*
- 1877 Brown, Lieut. J. C., Lieut. Gen. *Haddington, Scotland.*
- 1878 *Brown, John Allen, Esq. *The Laurels, The Haven, Easing, W.*
- 1879 Brown, Richard, Esq., C.R. *115, Lansdowne-road, Notting-hill, W.*

Year of
Honour.

- 1867 180 Brown, Robert, Esq. 4, Gladstone-terrace, Hope-park, Edinburgh.
- 1856 *Brown, Samuel, Esq. 11, Lombard-st., E.C.; and The Elms, Larkhall-rose, Clapham, S.
- 1858 *Brown, Thomas, Esq. 8, Hyde-park-terrace, Hyde-park, W.
- 1859 Brown, William, Esq. Loat's-road, Clapham-park, S.
- 1858 Browne, H. H., Esq. 70, Westbourne-park-villas, Harrow-rd., Paddington, W.
- 1862 Browne, John Comber, Esq., Superintendent and Inspector of Government Schools. Port Louis, Mauritius.
- 1858 Browne, John H., Esq. Port Gawler, S. Australia.
- 1864 *Browne, Capt. Wade. 8, Charles-street, Berkeley-square, W.
- 1858 Browne, William J., Esq. Port Gawler, S. Australia.
- 1852 Browning, Henry, Esq. 72, Grosvenor-street, W.; and Amptham-hall, Bury St. Edmund's.
- 1856 190* Browning, Thomas, Esq. 6, Whitehall, S.W.
- 1859 Bruce, Henry Austin, Esq., M.P. Duffryn, Aberdare, Glamorganshire.
- 1863 Brunton, John, Esq., M.I.C.E., F.G.S. 37, Kensington-park-gardens, W.
- 1856 Bryant, Walter, Esq., M.D., F.R.C.S. 7, Bathurst-street, Hyde-park-gardens, W.
- 1843 *Buchan, John Hitchcock, Esq. The Grove, Hamwell, W.
- 1867 *Bucklench, his Grace the Duke of, K.G., F.R.S. Dalkeith Palace, near Edinburgh; and Montagu-house, Whitehall, S.W.
- 1859 Buckland, Edward C., Esq. 36, Lansdowne-road, Notting-hill, W.
- 1863 Budd, J. Palmer, Esq. Fynyddoren, near Swansea.
- 1865 Buller, Sir Edward M., Bart., M.P. Old Palace-yard, S.W.; and Dilhorn-hall, Cheddle, Staffs.
- 1867 *Bulger, Capt. George Ernest, F.L.S., &c. Care of Mr. Booth, 307, Regent-st., W.
- 1863 300 Bullock, Commander Charles J., R.N. Hydrographic-office, S.W.
- 1830 *Bullock, Rear-Admiral Frederick. Woolwich, S.E.
- 1864 Bullock, W. H., Esq. Grosvenor-hill, Wimbledon, S.W.
- 1858 *Bunbury, Sir Charles James Fox, Bart.; F.R.S. Barton-hall, Bury St. Edmund's.
- 1839 Bunbury, E. H., Esq., M.A. 35, St. James's-street, S.W.
- 1863 Bundoock, F., Esq. Windham Club, S.W.; and 4, Radnor-place, Gloucester-square, W.
- 1861 Burgess, William, Esq. Feltham, Co. Tipperary.
- 1866 Burgess, James, Esq., M.B.A.S., Principal of Sir J. Jejeebhoy's Parsee B. Institution. Hornby-rose, Bombay. Care of T. E. Gillespie, Esq., 31, Essex-st., Strand, W.C.
- 1863 Burgoyne, Capt. Hugh Talbot R.N., V.C. 8, Gloucester-gardens, Hyde-park, W.
- 1864 Burn, Robert, Esq. 5, Clifton-place, Sussex-square, W.
- 1863 310* Burns, John, Esq. 1, Park-gardens, Glasgow; and Castle Wemyss, by Greenock, N.B.
- 1861 *Burr, Higford, Esq. 23, Eaton-place, S.W.; and Aldermanston-court, Berkshire.
- 1857 Burstal, Capt. E., R.N. 6, Park-villas, Lower Norwood, S.
- 1858 *Burton, Alfred, Esq. 36, Marina, St. Leonard's.
- 1833 *Burton, Decimus, Esq., F.R.S. 14, Spring-gardens, S.W.; and St. Leonard's-ottage, Hastings.

- 1859 *Barton, Capt. Nichl. Prae. 18th Regt. Bombay N.I., H.B.M. Consul at Santos, Brazil. 14, St. James's-st., S.W. Care of R. Arundell, Esq., Mansfield, Somerset House, W.C.
- 1858 Bary, William Count, Viscount, M.P. 48, Audland gate, S.W.
- 1861 Bush, Rev. Robert Walter, M.A. 1 Minor-square, Islington, N.
- 1862 Butler, Charles, Esq. 13, Grosvenor-square, W.
- 1862 Butler, E. Lindley, Esq. Geographical Department, British Museum, W.C.
- 1867 325*Butler, Rev. Marco Rector of Ucombe). Ucombe Rectory, Staplehurst, Kent.
- 1860 *Butler, Rev. Thomas. Rector of Lough, Nottinghamshire.
- 1862 *Buxton, Chas., Esq., M.P. 7, Grosvenor-crescent, S.W.; and Fox-ecumen, Surrey.
- 1858 *Buxton, Sir Thomas Fowell, Bart., M.P. Brick-lane, N.E.
- 1866 Dyas, Robert D., Esq. Melk-Ro-park, Tunbridge Wells.
- 1864 Eytches, Capt. J., R.M. V.C. 29, Grosvenor-place, Bath. Care of G. J. Noel, Esq., Admiralty, S.W.
- 1830 *Caldell, R. B., Esq., M.A., F.R.S., F.S.A. 1, Brick-court, Temple, E.C.; 22, Portland-place, W.; and Aldwick, Sussex.
- 1866 Caldwell, Capt. J. B. and 11 Sup. at Aden 17, West Mall, Chifton, and 129, Leadenhall-street, E.C. Care of Mrs. Caldwell, 9, Oxford-road, Islington, N.
- 1857 *Caldwell, Capt. Henry, R.N. H.M.S. "Mersey," Portsmouth; and 2, Anker-square, W.
- 1863 Callaghan, Thos. F., Esq. Gerrick Club, W.C.
- 1848 110 Callthorpe, Lord 55, Grosvenor-square, W.
- 1861 Callthorpe, the Hon. Augustus Gough. 33, Grosvenor-square, W.
- 1855 *Callthorpe, the Hon. G. H. Gough, M.P. 15, Grosvenor-square, W.
- 1854 Calvert, Frederic, Esq., M.P. 5, Finsbury-street, Finsbury, W.; and 8, New square, Lincoln's-inn, W.C.
- 1858 Carson, Capt. Charles D. Care of F. Hertlet, Esq., Foreign-office, S.W.
- 1861 Cameron, James, Esq. Auchnesserry, Invernesshire.
- 1858 Cameron, Major General Sir Duncan Alexander, R.N., C.B. New Zealand.
- 1864 Cameron, J., Esq. Southampton. Care of Messrs. Smith, Fisher, and Co.
- 1860 Cameron, R. W., Esq. Staten Island, New York. Care of Messrs. Brown and Co., 18 Peter's-lambers, Cornhill, E.C.
- 1861 Campbell, Capt. Frederick, R.N. 11, Cannon-street, City, W.
- 1866 140 Campbell, George, Esq. 13, St. George's-crescent, Finsbury, S.W.; and Abchurch Lane Club.
- 1861 Campbell, James, Esq. 152, Regent-street, W.; and Thornton-street, York.
- 1844 *Campbell, James, Esq. Grasshouse, Hendon, Middlesex; and 8, Park-street, Grosvenor-square, W.
- 1857 Campbell, James, Esq., Surgeon R.N. Bangkok, Siam. Care of Messrs. Smith, Fisher, and Co.
- 1861 *Campbell, James, Esq., Junr. Hampton-court-green, S.W.
- 1863 Campbell, Jas. Duncan, Esq.
- 1857 Camps, William, Esq., M.P. 40, Park-street, Grosvenor square, W.

Year of Election.

- 1866 Cassing, Sir Samuel, C.E. *The Manor-house, Abbots Langley, nr. Watford, Herts.*
- 1864 Cannon, John Wm., Esq. *Castle-grove, Twam.*
- 1857 Cannon, J. Leut.-General R. 10, *Kensington-gardens-terrace, W.*
- 1853 350* Cardwell, Right Hon. Edward, M.P. 74, *Eaton-square, S.W.*
- 1863 *Carew, R. Russell, Esq., J.P. *Carpenters-park, Watford, Herts; and Oriental Club, W.*
- 1862 Cargill, John, Esq., Member of the Legislative Assembly of New Zealand and Legislative Council of Otago. *Dunedin, Otago, New Zealand.*
- 1863 *Cargill, Wm. W., Esq. 4, *Connaught-place, Hyde-park, W.*
- 1864 *Carmichael, L. M., Esq., M.A., 5th Lancers, *Canterbury. Care of H. T. Clark, Esq., 50, Leicester-square, W.*
- 1865 *Carnegie, David, Esq. *Eastbury, by Watford, Herts.*
- 1863 Carnegie, Admiral, the Hon. J., R.N. *H.M.S. 'Salamander.'*
- 1864 Carrington, R. C., Esq. *Admiralty, S.W.*
- 1861 Carter, Captain Hugh Bonham, Coldstream Guards. *Guards' Club, S.W.; and 1, Curiale-place, Victoria-street, S.W.*
- 1860 Cartwright, Capt. Henry, F.S.A. *Barbican-lodge, Gloucester.*
- 1867 360 Cartwright, Col. Henry, Grenadier Guards, M.P. 1, *Tilney-street, Park-street, Grosvenor-square, W.*
- 1860 *Carver, the Rev. Alfred J., D.D., Master of Dulwich College. *Dulwich, S.*
- 1864 Casella, Louis P., Esq. 23, *Hatton-garden, E.C.; and South-grove, Highgate, N.*
- 1860 Cave, Amos, Esq. 109, *New-road, Kennington-park, S.; and Rathbone-place, Oxford-street, W.*
- 1857 Cave, Capt. Laurence Trent. 23, *Lowndes-street, Belgrave-square, S.W.*
- 1858 Cave, Stephen, Esq., M.P. 35, *Wilton-place, S.W.*
- 1863 Challis, John Henry, Esq. *Reform Club, S.W.*
- 1865 Chambers, Charles Harcourt, Esq., M.A. 2, *Chesham-place, S.W.*
- 1864 Chambers, David, Esq. *Paternoster-row, E.C.*
- 1866 Chambers, Lieut.-Col. John (J.P., Lancashire). *Priory House, Eccerton, near Liverpool; and Portobello-house, Mortlake, Surrey.*
- 1867 370 Chambers, Wm. Thomas Hodgetts, Esq. *Chichester, Sussex; and 5, Osborne-villas, Stoke, Devonport.*
- 1858 Champion, John Francis, Esq. *High-street, Shrewsbury.*
- 1866 *Chandless, Wm., Esq., B.A. 1, *Gloucester-place, Portman-square, W.*
- 1867 Chapman, James, Esq. *Cape Town, Cape of Good Hope.*
- 1863 *Chapman, Spencer, Esq. *Roehampton, S.W.*
- 1860 Charlemont, Lord. *Charlemont-house, Dublin.*
- 1861 Charnock, Richard Stephen, Esq., F.R.D., F.S.A. 8, *Gray's-inn-square, W.C.; and The Grove, Hammermith.*
- 1864 Cheadle, Walter, Esq., B.A., M.D. Camb. 2, *Hyde-park-place, Cumberland-gate, W.*
- 1861 Chesham, John Frederick, Esq. *Eastwood, Staleybridge.*
- 1864 Cheshire, Edward, Esq. *Conservatio Club, S.W.*
- 1858 380* Chesney, Major-General Francis Rawdon, B.A., D.C.L., F.R.S. *Athenæum Club, S.W.; and Ballyardle, Down, Ireland.*

Year of Election	
1453	Chotwode, Augustus L., Esq., 7, Suffolk-street, Pall-mall-east, S.W.; and Chilton-house, Thame, Oxfordshire.
1458	Childers, Hugh C. K., Esq., M.P., 17, Piccadilly-gardens, W.; and Austria.
1456	Childers, John Webster, Esq., <i>Limley-hall</i> , near Doncaster.
1457	*Chomson, Comdr. William, R.N., <i>Hydrographic-office</i> , S.W.
1450	*Church, W. H., Esq.
1849	Charles I., Lord Alfred Spencer, 16, Rutland-gate, S.W.
1856	Chatchill, Charles, Esq., <i>Woburn-park</i> , Surrey.
1855	Clarendon, George William, Esq., M.A., C.C.B., 1, Grosvenor-crescent, S.W. <i>The Grove</i> , Watford, Herts., and <i>Hindon</i> , Wilts.
1863	Clark, Lieut. Alex. J., 4, St. James's-square, N.W.; and <i>Brevell-house</i> , <i>Almeida</i> , <i>Acquaforte</i> , <i>Monmouthshire</i> .
1840	37. *Clark, Sir James, Bart., M.P., R.N., <i>Longshot-park</i> , Surrey.
1862	Clark, Lester, Esq., 1, Victoria-street, Westminster, S.W.; and <i>Cauro</i> .
1865	Clark, W. H., Esq., 6, Leicester-square, Hyde-park, W.
1858	Clarke, Capt. A., R.N., <i>Army and Navy Club</i> , S.W.
1855	*Clarke, Rev. W. D., M.A., <i>St. Leonard's</i> , Sydney, New South Wales. <i>Mewra</i> , <i>Richmond</i> , <i>Connell</i> .
1859	Clarke, Rev. W. Cecil, M.A., <i>Trinity College</i> , Cambridge.
1862	Clande, Eugene, Esq., 22, Park-road, Holloway, N.
1842	*Clavering, Sir William Amyas, Bart., M.A., <i>United University Club</i> , S.W., <i>Acorn-park</i> , near <i>Stashems</i> , and <i>Greenacre</i> , <i>Darham</i> .
1863	Clay, Sir Wm., Bart., 91, London-square, S.W.
1863	Clayton, Capt. John W., late 15th Hussars, 14, Portman-square, W.
1866	40. Clayton, Sir W. R., <i>Harrogate</i> , <i>Great Marlow</i> , <i>Rocks</i> .
1866	*Cleghorn, Hugh, Esq., M.B., Conservator of Forests, <i>Madras</i> .
1861	Clements, Rev. H. G., <i>United University Club</i> , S.W.
1860	Clerk, Capt. Claude, <i>Military Prison</i> <i>Queen's Bench</i> <i>Southwark</i> , S.
1848	Hermont, Thomas, Lord, <i>Roseville-park</i> , <i>Nenagh</i> , Ireland.
1845	*Cleveland, His Grace the Duke of, <i>Cleveland-house</i> , 17, St. James's-square, S.W.
188	Clifford, Sir Charles, <i>Cokham-Juli</i> , <i>Suffolk</i> .
1858	Clifford, Charles Cavendish, Esq., <i>House of Lords</i> , S.W.
1866	Clifton, Lord Edward, M.P., <i>see</i> <i>Army and Navy Club</i> , S.W.
1865	Clipperton, Robert Charles, Esq., II B.M. Consul, <i>Kertch</i> . <i>Care of F. G. Mowley</i> , Esq., <i>Foreign Office</i> , S.W.
1858	41. Clive, Rev. Archer, <i>Whithead</i> , <i>Hireford</i> .
1863	Clowes, E., Esq., <i>Salisbury-square</i> , <i>East-street</i> , E.C.
1864	Clowes, George, Esq., <i>Staring-croft</i> , S.W., <i>Duck-street</i> , <i>Stamford-street</i> , <i>Blackfriars</i> , S.; and <i>Sarabon</i> , <i>Surrey</i> .
1864	Clowes, Rev. George, M.A., <i>Surbiton</i> , <i>Surrey</i> .
1854	Clowes, William, Esq., 31, Gloucester-terrace, Hyde-park, W.; and <i>Charing-croft</i> .
1861	Clowes, William Charles Knight, Esq., M.A., <i>Duke street</i> , <i>Stamford-street</i> , <i>Blackfriars</i> , S.; and <i>Sarabon</i> , <i>Surrey</i> .
1852	Cobbold, John Chevalier, Esq., M.P., <i>Athenaeum Club</i> , S.W.; and <i>Ipswich</i> , <i>Suffolk</i> .

Year of Election.	
1859	Cochrane, Capt. the Hon. A., R.N., C.B. <i>Junior United Service Club, S.W.</i>
1868	Cockerton, Richard, Esq. 12, <i>Petersham-terrace, South Kensington, W.</i>
1862	*Cockle, George, Esq. 77, <i>Onslow-square, S.W.</i>
1859	420 Cocks, Colonel C. Lygon, Coldstream Guards. <i>Trevellyn-Vean, near Lisheard.</i>
1845	Cocks, Major Octavia York. 180, <i>Piccadilly, W.</i>
1841	*Cocks, Reginald Thistlethwayte, Esq. 43, <i>Charing-cross, S.W.</i> ; and 22, <i>Hartford-street, May-fair, W.</i>
1847	Coghlan, Edward, Esq. <i>Training-institution, Gray's-inn-road, W.C.</i>
1861	Coghlan, J., Esq., Engr.-in-Chief to the Government. <i>Buenos Ayres. Care of Messrs. J. Fair and Co., 4, East India-avenue, Leadenhall-street, E.C.</i>
1862	Coghlan, Major Gen. Sir William M., K.C.B., R.A. <i>Ramsgate, Kent.</i>
1865	Colchester, Reginald Charles Edward, Lord. <i>All Souls' College, Oxford.</i>
1807	Colebrook, John, Esq. 194, <i>Sloane-street, Chelsea, S.W.</i>
1841	*Colebrooke, Sir Thomas Edward, Bart., M.P., F.R.S. 37, <i>South-st., Park-lane, W.</i>
1834	Colebrooke, Lt.-General Sir Wm., R.A., M.G., C.B., K.H., F.R.S. <i>Datchet, near Windsor; and United Service Club, S.W.</i>
1854	430 Coleman, Everard Home, Esq., F.R.S. <i>Registry and Record Office, Adelaide-place, London-bridge, E.C.</i>
1848	Colea, Charles, jun., Esq. 86, <i>Great Tower-street, E.C.</i>
1835	*Collett, William Rickford, Esq.
1867	Collier, C. T., Esq. (Barrister of the Middle Temple). <i>Cedar-villa, Sutton, Surrey; and Oriental Club, W.</i>
1858	Collinson, Henry, Esq. 7, <i>Cedars-road, Clapham-common, S.</i>
1866	Collinson, John, Esq., C.E. 9, <i>Clarendon-gardens, Maida-hill, W.</i>
1845	Collinson, Rear-Admiral Richard, C.B. <i>Haven-lodge, Ealing, W.; and United Service Club, S.W.</i>
1840	Collison, Francis, Esq. <i>Horn-hill, Surrey, S.</i>
1844	Colnaghi, Dominic E., Esq. <i>Care of F. B. Alston, Esq., Foreign-office, S.W.</i>
1862	Colquhoun, Sir Patrick, M.A.
1866	440 Colquhoun, Sir Robert G., K.C.B. 6, <i>Ulster-terrace, Regent's-park, N.W.</i> ; and 14, <i>Arlington-street, W.</i>
1861	*Colville, Charles John, Lord. 42, <i>Eaton-place, S.W.</i>
1865	Colvin, Binney J., Esq. 26, <i>Oxford-square, Hyde-park, W.</i>
1861	Combe, Thomas, Esq., M.A. <i>University Press, Oxford.</i>
1864	Commerell, Commr. J. E., R.N., V.C. <i>Akerbank, near Gosport.</i>
1864	Conger, John, Esq. <i>Hallbrooke-house, New Wandsworth, N.W.</i>
1861	Constable, Capt. Chas. Golding, I.N. 68, <i>Hamilton-ter., St. John's-wood, N.W.</i>
1859	Cooke, Lt.-Colonel A. C., R.E. <i>Topographical Department, 4, New-street, Spring-gardens, S.W.</i>
1863	*Cooke, E. W., Esq., A.R.A., F.R.S., F.L.S., F.G.S. <i>The Ferns, Kensington, W.</i>
1856	Cooke, John George, Esq. 47, <i>Mount-street, Berkeley-square, W.</i>
1860	450 Cooke, Rev. J. Hunt. <i>Gladstone, Southsea, Hants.</i>
1860	Cooke, Nathaniel, Esq. 5, <i>Ladbroke-terrace, Notting-hill, W.</i>
1829	Cooke, Robt. F., Esq. 50, <i>Albemarle-street, W.</i>

List of Fellows of the

Year of
Enrollment

- 1830 Cocks, William Henry, Esq. Barrister-at-Law 4, Elm-court, Temple, E.C.
- 1830 Cooley, William Desborough, Esq. 136, Euston road, N.W.
- 1832 Cooper, Sir Daniel. 20, France-street, S.W.
- 1836 Cooper, Lt. Col. Edward, Grenadier Guards. 5, Abingdon square, W.
- 1830 Cooper, Lt.-Col. Joshua H., 7th Fusiliers. Kensington, Middlesex.
- 1833 Cocks, Charles Cooley, Esq. C4, Albany, W., and Mount-Coole, Limerick, Ireland.
- 1857 *Coote, Captain Robert, R.N. Shooter, Bittern, Southampton.
- 1862 460 Cope, Walter, late H.M.'s Charge d'Affaires at the Equador. 14, The Terrace, Cambridge, S.
- 1853 Copley, Sir Joseph William, Bart. Springfield, Lancaster.
- 1834 Cork and Orrery, Earl of. 1, Grafton-street, W.
- 1835 Cornthwaite, Rev. T., M.A. Forest, Wiltshire.
- 1830 Cornwell, James, Esq., M.D. Loughborough-park-villa, Bristol, S.
- 1839 *Corrance, Frederick, Esq. Parkham-hall, Wingham Market, Suffolk.
- 1856 Costerton, John C. Esq. Custom.
- 1833 *Cosway, William Halliday, Esq. Oxford and Cambridge Club, S.W.
- 1833 Courtney, L. W., Esq. British Post-office, Constantinople. Care of R. Wood, Esq., 159, Fleet-street.
- 1835 Cowan, John E., Esq. 23, Penbigh-street, S.W.
- 1862 470 Coward, William, Esq. 3, Park-lane, Inner Row, N.
- 1857 *Cowell, Major Sir J. C., R.G.A., R.E. Buckingham-palace, S.W.
- 1834 Cowley, Norman, Esq. 4, Montagu-place, Montagu-square, W.
- 1852 Cowpe, Sedgwick S., Esq. Messrs. J. Clark and Son, Abchurch-lane, E.C.
- 1832 Coz, Edward William, Esq., Barrister-at-Law, Recorder of Falmouth. 1, Essex-court, Temple, E.C., and Mount-aunt, Highwood, Miletona.
- 1863 Coysh, John S., Esq. Leasant-house St. Helen's-square, E.C.
- 1837 Crane, Leonard, Esq., M.D. 7, Albemarle street, W.
- 1853 Cranford, Captain F. A. R., R.N. Care of Messrs. Woodhead and Co., 44, Oldbury-croft, S.W.
- 1857 Cranford, Lieut.-General James Robertson, Grenadier Guards. Travellers' Club, S.W., and 36, France's-garden, W.
- 1848 Crawford, Robert Wigram, Esq., R.N. 71, Old Broad-street, E.C.
- 1830 480 Cranford, John, Esq., F.R.S. Athenaeum Club, S.W.; and 4, Elvaston-place, Queens-gate, S.W.
- 1856 Crawford, O. J., Esq. Athenaeum Club, S.W.
- 1841 Crewe, Rev. S. F., M.A. The Grammar School, Dartford, North Kent.
- 1859 *Creyke, Capt. Richard Boynton R.N. Uxerstone, Lincolnshire.
- 1836 Croker, T. F. Dixon, Esq. 19, Piccadilly-square, Beccington, S.W.
- 1834 Croll, A. A., Esq., C.E. Southwood, Southwood lane, Highgate.
- 1833 *Crooke, J. Rodney, Esq. 84, King William-street, E.C.; and Forest-house, High Birch, Essex.
- 1830 Crooke, the Rev. Thomas, M.A., M.B.A.S. Huxley, N.
- 1832 Croxman, James Hecutt, Esq. Rock-park, Chigwell, Essex.

Year of
Election.

- 1863 *Crowder, Thos. Mosley, Esq., M.A. *Thornton-hall, Bedale, Yorkshire.*
- 1862 490 Crowdy, James, Esq. 17, *Sergeant's-inn, E.C.*
- 1859 Cull, Richard, Esq., F.S.A. 18, *Tavistock-street, Bedford-square, W.C.*
- 1857 Cumming, William Fullarton, Esq., M.D. *Athenaeum Club, S.W.; and Athol-crescent, Edinburgh.*
- 1847 *Cunard, Sir Edward, Bart. *Care of Messrs. D. and C. MacIver, Liverpool.*
- 1860 Cunliffe, Roger, Esq. 24, *Lombard-street, E.C.; and 10, Queen's-gate, South Kensington, W.*
- 1844 Cunningham, H. Esq.
- 1853 Cunningham, John Wm., Esq., Sec. King's College. *Somerset-house, W.C.; and Harrow, N.W.*
- 1842 *Cunynghame, Major-Gen. A. T., C.B. *Commanding Dublin Division, Royal Barracks, Dublin.*
- 1865 Cure, Capel, Esq. 51, *Grosvenor-street, W.*
- 1843 *Cursetjes, Manockjee, Esq., F.R.S.N.A. *Villa-Byculla, Bombay.*
- 1844 500 *Curtis, Timothy, Esq.
- 1865 Carson, Hon. R. 24, *Arlington-street, W.; and Parkham-park, Staying, Sussex.*
- 1864 Dallas, A. G., Esq. 38, *Beaufort-gardens, W.*
- 1863 *Dalgety, Fred. G., Esq. 8, *Hyde-park-terrace, W.*
- 1865 D'Almeida, W. B., Esq. 19, *Green-park, Bath.*
- 1863 Dalrymple, Donald, Esq. *Norwich.*
- 1867 Dalrymple, Geo. Elphinstone, Esq. *Logie, Elphinstone, Aberdeenshire.*
- 1847 Dalton, D. Foster Grant, Esq. *Shanks-house, near Wincanton, Somerset.*
- 1849 Dalyell, Sir Robt. Alex. Osborn, Bart. *H.M.'s Consul at Jassy; and 120, Belgrave-road, S.W.*
- 1866 Damer, Lt.-Col. Lionel S. Dawson. 2, *Chapel-street, Grosvenor-square, W.*
- 1842 510 Darvall, John Bayly, Esq.
- 1838 *Darwin, Charles, Esq., M.A., F.R.S. 6, *Queen Anne-street, Cavendish-square, W.*
- 1860 Darnley, John Bury, Esq. 22, *Warwick-road, Maida-hill, W.*
- 1848 Davies, R. H., Esq.
- 1845 *Davis, Alfred, Esq. *Norfolk-hotel, Norfolk-square, Hyde-park, W.*
- 1866 Davis, Edmund F., Esq. 6, *Cork-street, Bond-street, W.*
- 1858 Davis, Dr. Francis William, Surgeon R.N. *H.M.S. 'Alert,' and Elm-lodge, St. Ann's-hill, Wandsworth, S.W.*
- 1866 Davis, Frederick E., Esq. 20, *Blandford-square, N.W.*
- 1841 Davis, Staff-Commander John Edward, R.N. *Hydrographic-office, Admiralty, S.W.*
- 1840 Davis, Sir John Francis, Bart., K.C.B., F.R.S., F.R.S.N.A. *Athenaeum Club, S.W.; and Hollywood, near Bristol.*
- 1840 520 *Dawney, the Hon. Payan. *Beningborough-hall, Newton-upon-Ouse, Yorkshire.*
- 1840 Debary, Rev. Thomas, M.A. 85, *Mount-street, W.*
- 1866 Debenham, William, Esq. 8, *Porchester-square, Hyde-park, W.*
- 1859 De Blaquiere, John, Lord. 9, *Stratford-place, W.*

Year of Admission	
1854	De Bougho, T. J., Esq. 6, Charing-cross, S.W.
1856	De Crespigny, Lieut. C., R.N.
1856	De Gex, William Francis, Esq. 23, Throgmorton-street, E.C.
1858	De Grey and Lipon, George Frederick Samuel, Esq. 1, Carlton-gardens, S.W.; and Stellen B. gul, B. gon
1863	De Laan, A., Esq.
1863	Dennis Adam Sir Henry Maagles, B. K., K.C.B. 21, Carlton-road, Maida-vale, W.
1869	530 Dennis, Alfred, Esq. 6, Albermarle-street, W.
1874	*Den son, Sir William Thomas, K.C.B. Lieut. Col. R.E., F.R.S. Overbury, East Devon.
1876	Deuman, Rear-Admiral the Hon. Joseph Commander-in-Chief, Pacific; and 17, Eaton-terrace, S.W.
1893	*Derby, Edward Geoffrey, Esq. of, P.C., F.R.S. 23, St. James's-square, S.W., and Knowlesy-park, Farnham, Lancashire.
1887	De Sales, Col. Lodolph, C.B. 123, Pall-mall, S.W.
1874	*Devaux, Alexander, Esq. 2, Avenue-road, Regent's-park, N.W.
1897	*Devonshire, William Cavendish, Duke of, B.D., P.C., M.B., F.R.S. Devonshire- house, Piccadilly, W., and Hardwick-hall, Derbyshire.
1865	Dew, Capt. Robert, C.B., B.A. Army and Navy Club, S.W.; and 87 James's street, S.W.
1864	Dick, A. H. Esq., M.A., Roseland-house, Partrick, near Glasgow.
1862	Dick, Capt. Charles Cranmond. Exeter, Devon.
1866	440 *Dick, Fitzwilliam, Esq., M.P. 20, Curzon-square, Mayfair, W.
1881	Dick, Robert Kerr, Esq., Bengal Civil Service, Oriental Club, W.
1888	Dick, William Thomas, Esq. 29, Leinster-square, W.
1861	*Dickenson, Sebastian Stewart, Esq., Barrister-at-Law. Green-hill, Stroud, Gloucestershire.
1830	*Dickinson, Francis Henry, Esq., F.R.S. 8, Upper Harley-street W., and Kingston-park, Somerset.
1833	Dickson, John, Esq., F.R.S., F.S.A. 39, Upper Brook-street, W., and Abbot's-hill, Hemel-Hempstead.
1832	Dickinson, John, Esq., Jun. Clarence-chambers, 12, Haymarket, S.W.; and Abbot's-hill, Hemel-Hempstead.
1858	Dickson, A. Benson, Esq. 4, New-square, Lincoln's-inn, W.C.
1838	Dickson, Charles Haamer, Esq. H.D.M. Consul, Sukum Koff, Black Sea. Care of J. Murray, Esq., Foreign-office, S.W.
1890	Dickson, Lieut.-Col. Lothian McNeill 10, Stanhope-terrace, Hyde-park, W.
1860	550 Dietz, Bernard, Esq., of Alton Bay. 3, Dorset-square, W.
1830	Digby, G. Wingfield, Esq. Sherbornes-castle, Dorset.
1860	Digby, Lieut.-Col. John Almerus, Chilmington-house, Cuddesloe, Dorchester.
1843	*Dike, Sir Charles Wentworth, Bart., M.P. 76, St. James's-street, S.W.
1839	*Dilke, Charles Wentworth, Esq. 70, St. James's-street, S.W.
1855	Dillon, the Hon. Arthur. 17, Chancery-street, W.
1864	Discombe, J. C., Esq. 50, Cornhill, E.C., and 32, Cleveland-square, S.W.
1867	Dix, Thomas, Esq. 10, Amstel street, W.C.

Year of
Death.

- 1861 Dixon, Lieut.-Colonel John. 10, *Seymour-street, Portman-square.*
- 1854 Dixon, W. Hepworth, Esq., F.R.S. 6, *St. James's-terrace, Regent's-park, N. W.*
- 1857 560 Dobie, Robert, Esq., M.D., R.N. 7, *Houghton-place, Amphilil-square, Hampstead-road, N. W.*
- 1854 Dodson, John George, Esq., M.P. 6, *Seamore-place, Mayfair, W.*
- 1854 Domville, William T., Esq., M.D., R.N. *Army and Navy Club, S. W.*
- 1867 Donald, James, Esq. 20, *Melville-terrace, Edinburgh.*
- 1858 Donne, John, Esq. *Inston, North Devon.*
- 1864 Doran, Dr. John, F.R.S. *Royal-crescent, Notting-hill, W.*
- 1850 Dover, John William, Esq. 132, *Stanley-street, Belgravia, S. W.*
- 1853 Doyle, Sir Francis Hastings C., Bart. *Custom-house, E.C.*
- 1845 *Drach, Solomon Moses, Esq. F.R.S. 39, *Howland-street, Fitzroy-square, W.*
- 1864 Drew, Major H. 14, *St. James's-square, S. W.*
- 1857 570 Drummond, E. A., Esq. 2, *Bryanston-square, W.*
- 1846 Drummond, Lieut.-General John. *The Boyce, Dymock, Gloucestershire.*
- 1846 Drury, Capt. Byron, R.N. *The United Service Club, S. W.*
- 1857 Dublin, His Grace the Archbishop of. *Dublin.*
- 1851 *Du Cane, Major Francis, R.N. 64, *Lowndes-square, S. W.*
- 1851 *Dunbar, Henry John, Esq., F.R.S. 30, *Prince's-gate, S. W.*
- 1859 Duckworth, Henry, Esq. 2, *Gambier-terrace, Liverpool.*
- 1850 *Duff, Mountstuart Elphinstone Grant, Esq., M.P. 4, *Queen's-gate-gardens, South Kensington, W.*
- 1857 *Dufferin, Right Hon. Lord, K.P. K.C.B. *Dufferin-lodge, Fitzroy-park, Highgate, N.*
- 1850 *Dugdale, Captain Henry Charles G. *Mercvale-hall, Atherton, Warwick.*
- 1867 580 *Dugdale, John, Esq. 1, *Hyde-park-gardens; and Lhwy, Llanfyllin, Oncostry.*
- 1850 Duke, Sir James, Bart. *Loughton-lodge, Sussex.*
- 1850 Duncan, Capt. Francis, R.A., M.A., F.R.S. *The Citadel, Plymouth.*
- 1861 *Duncan, George, Esq. 45, *Gordon-square, W.C.*
- 1840 *Dundas, Right Hon. Sir David, Q.C., M.P. 13, *King's-Bench-walk, Temple, E.C.; and Ochertyre, Stirling.*
- 1860 Dunell, Henry James, Esq. 12, *Hyde-park-square, W.*
- 1859 *Dunlop, R. H. Wallace, Esq., C.B., Indian Civil Service. *Messrs. Grundlay and Co., Parliament-street.*
- 1860 *Dunmore, Charles Adolphus Murray, Earl of. 24, *Carlton-house-terrace, S. W.*
- 1837 *Dunraven, Edwin Richard, Earl of, F.R.S. *Adare-manoor, Limerick; and Dunraven-castle, Glamorganshire.*
- 1850 Duprat, Chevalier Alfredo. *H.M.F. Arbitrator, Cape Town, Cape of Good Hope.*
- 1852 590 D'Urban, M.-Gen. W. J. *Deputy Quartermaster-General, Canada; U. S. Club, S. W.; and Newport, near Exeter.*
- 1865 Dutton, F. S., Esq. *Reform Club, S. W.; and Adelaide, Australia.*
- 1867 Radie, Robert, Esq. *Blaydon-on-Tyne, Durham.*
- 1850 Eardley-Wilmot, Capt. A. P., R.N., C.B. *H.M.S. 'Nile,' Queenstown; Deptford Dockyard, E.*

Year of Foundation	
1855	Eardley-Wilmot, Col F., R.N. <i>Shedbury Ness, Russ.</i>
1856	Eardley-Wilmot, Sir John E. 3, <i>Newton-place, Queen's-gate, W.</i>
1858	Eames, William, Esq., F.R.S. 5, <i>Bath-on-lis, The Park, Gloucester.</i>
1857	Rastwick Captain W. J. 12, <i>Latimer-terrace, Hyde-park, W.</i>
1858	Eaton, P. A., Esq. <i>New University Club, St. James's-street, S.W.</i>
1858	*Eaton, H., Esq. 10, <i>Prince's-gate, Hyde-park, W.</i>
1858	605 *Eaton, Henry William, Esq., M.P. 10, <i>Prince's-gate, Hyde-park, W.</i>
1858	*Eaton, William Meriton, Esq., 10, <i>Prince's-gate, Hyde-park, W.</i>
1860	Edwell, Surgeon Major W. C. B., M.D. 17, <i>Kensington-park-terrace, Notting-hill, W.</i>
1861	Eber, General P. 33, <i>St. James's-square, S.W.</i>
1863	Ebury, Lord, 15/7, <i>Park-street, Grosvenor-square, W., and Moor-park, Herts.</i>
1862	Eben, Rear-Adm. Charles, C.D. 20, <i>Wilton-place, S.W.</i>
1858	Edge, Rev. W. J., M.A. <i>Bowenden-vicarage, near Sturminster, Kent.</i>
1863	Edgeworth, M. P., Esq. B.L.S.O.S. <i>Mastern-house, Antrim, S.</i>
1857	*Edwards, James, Esq. <i>Bolton-terrace, by Prater, N.B.</i>
1868	*Edwards, Thomas Dyer, Esq. 5, <i>Hyde-park-gate, Kensington, W.</i>
1863	610 Edwards, G. T., Esq., M.A. 60, <i>Gloucester-terrace, W.</i>
1861	*Edwards, Henry, Esq. 55, <i>Berkley-square, W.</i>
1860	Edwards, Major James B., R.N. <i>Junior United Service Club, S.W. Messrs. Smith, Eldon, and Co.</i>
1857	Egerton, Commander Charles Kendall, R.N. 7, <i>Wilton-gate, S.W.</i>
1853	Egerton, Captain the Hon. Francis, R.N. <i>Draywater-house, S.W., and H.M.S. 'St. George.'</i>
1863	*Eliar, George, Esq. <i>Amek-castle, Ayrshire.</i>
1867	Eley, Charles John, Esq. <i>Junior Athen. Club, S.W.; and Old Brompton, S.W.</i>
1865	Ellis, Ney, Jun., Esq. 54, <i>Inverness-terrace, Baywater, W.</i>
1845	Ellenborough, Edward, Earl of, C.E.M. <i>Scuttham-house, near Cheltenham.</i>
1863	Elerton, John L., Esq. 6, <i>Comsught-place, Hyde-park, W.</i>
1840	620 Elliot, George, Esq., C.E. <i>The Hall, Houghton-spring, near Fosse House, Durham.</i>
1857	*Elliot, Capt. L. R. <i>La Moutre-sur-Saône, Gene Inferieur.</i>
1830	*Elliot, Rev. Charles Houston, M.A., F.R.S. <i>Sittingstone, Suffolk.</i>
1863	Ellis, W. L. H., Esq. <i>Hampstead-road, Gloucester, Oriental Club, W., and Lyceum Club, Bromby.</i>
1856	Elphinstone, Major Edward G., R.N. <i>Buckingham-palace, S.W.</i>
1857	Elton, Sir Arthur H., Bart. <i>Athenium Club, S.W.; and Cirencester, Somersetshire.</i>
1855	*Emanuel, Henry, Esq. 8, <i>Clarence-terrace, Regent's-park, N.W.</i>
1860	Emanuel, Joel, Esq., F.R.S. <i>Norfolk-castle, Lymington-road, Easton, W.</i>
1860	Ennis, John, Esq. 47, <i>Gray's-mews, W.C.</i>
1870	Endersby, Charles, Esq., F.R.S., F.L.S. 13, <i>Great St. Helen's, E.</i>
1864	630 Enfield, Edward, Esq., F.R.S. 19, <i>Chester-terrace, Regent's-park, N.W.</i>
1863	Englehart, Gardner J., Esq. 1, <i>Edon-place-south, S.W.</i>

Year of Election.	
1852	Erskine, Vice-Admiral John Elphinstone, M.P., O.B. <i>H.M.S. 'Edgar; 1 L, Albany, W., and Cardross, Stirling, N. B.</i>
1857	*Ezende, G. M. M., Esq. 29, <i>Park-street, Grosvenor-square, W.</i>
1850	Espinasse, Major J. W., 12th Regt. <i>Messrs. Richardson, and Co., Cornhill.</i>
1865	Evans, Colonel William Edwyn. 24, <i>Great Cumberland-place, Hyde-park, W.</i>
1857	Evans, F. J., Esq., Staff Commander, R.N., F.R.S., F.R.A.S. 4, <i>Wellington-terrace, Charlton, Blackheath, S.E.</i>
1830	*Evans, Vice-Admiral George. 1, <i>New-street, Spring-gardens, S.W.; and Eaglefield-green, Chertsey.</i>
1844	Evans, Thos. Wm., Esq., M.P. 1, <i>Dartmouth-street, Westminster, S.W.; and Allestree-wall, Derby.</i>
1830	*Evans, W. Esq.
1844	640 Evans, W. Herbert, Esq. <i>St. James's Club, Grafton-street, W.</i>
1861	Evelyn, Lieut.-Colonel George P. 4, <i>Onslow-crescent, Brompton, S.W.</i>
1851	*Evelyn, William J., Esq., F.R.S.A. <i>Evelyn Estate Office, Evelyn-street, Deptford.</i>
1830	*Everett, James, Esq., F.R.S.A.
1865	Everitt, George A., Esq. <i>Oakfield, Moseley, near Birmingham.</i>
1859	Ewart, William, Esq., M.P. 6, <i>Cambridge-square, W.</i>
1836	Ewing, J. D. Crum, Esq. 21, <i>Birchin-lane, E.C.</i>
1847	Eyre, Edward J., Esq.
1861	Eyre, George E., Esq. 59, <i>Lowndes-square, Brompton, S.W.</i>
1838	Eyre, M.-Gen. Sir Vincent, G.B. <i>Athenaeum Club, S.W.; and 33, Thwistle-square, S.W.</i>
1861	650 Fairbairn, William, Esq., C.E., F.R.S. <i>Manchester.</i>
1856	Fairholme, George Knight, Esq. <i>Union Club, S.W.; and Ravenswood, Melrose, N.B.</i>
1866	Fairman, Edward St. John, Esq., F.R.S., &c. 874, <i>Via Santa Maria, Pisa. Care of H. Fairman, Esq., 20, Rochester-terrace, Camden-town, N.W.</i>
1838	Falconer, Thomas, Esq. <i>Ust, Monmouthshire.</i>
1847	Falkland, Lucius Bantlock, Viscount. <i>Shuttercliffe, Yorkshire.</i>
1855	*Fanshawe, Admiral E. G. 63, <i>Eaton-square, S.W.</i>
1863	*Farrer, W. Jas., Esq. 24, <i>Bolton-street, Piccadilly, W.</i>
1844	Faulkner, Charles, Esq., F.R.S.A., F.G.S. <i>Deddington, Oxon.</i>
1863	*Faunthorpe, Rev. J. P., B.A. <i>Training-college, Battersea.</i>
1844	*Fayrer, Joseph, Esq., M.D. <i>Calcutta. Care of General Spens, 14, Drummond-place, Edinburgh.</i>
1858	660 Fawcett, J. N., Esq. 17, <i>Montagu-street, Portman-square, W.</i>
1866	Felkin, Wm., Esq., Jun., F.R.S. <i>Beeston, near Nottingham.</i>
1864	Ferguson, J., Esq. 6, <i>Gloucester-square, Hyde-park.</i>
1863	Ferguson, Alex., Esq. <i>Champion-hill, Camberwell, S.</i>
1840	*Ferguson, James, Esq., F.R.A.S. 20, <i>Langham-place, W.</i>
1860	Ferro, Don Ramon de Silva.
1844	Field, Hamilton, Esq. <i>Thornton-road, Clapham-park.</i>
1830	Findlay, Alexander, Esq. <i>Hayes, Kent, S.E.</i>

Year of Election	
1846	Fadley, Alex. George, Esq. 53, Fleet-street, E.C., and Hoyer, Kent, S.E.
1862	Fanna Thomas Quentel, Esq. Alderman Wandsworth, Surrey A.B.
1859	670 Fisher, Anthony L., Esq., M.D. 14, Park-place, Baker-street, Portman-square, W.
1863	Fisher, John, Esq. 60, St. James's-street, N.W.
1859	Fisher, Robert, Esq.
1857	*Fitzclarence, Commander the Hon. George, R.N.
1864	Fitzgerald, J. F. V., Esq. 11, Chester-square, S.W.
1861	Fitzgerald, Captain James. 2, Portland-place, W.
1864	FitzPatrick, Lieut. Francis Skelton, 42nd Regt Madras Army.
1859	*Fitzroy George Henry, Esq. Downshire-house, Kochampton; and Office of Maritime Customs, Shanghai.
1857	Fitzwilliam, the Hon. C. W., M.P. Brooks' Club, St. James's-street, S.W.
1867	*Fitzwilliam, William Thomas, Esq. 4, Grosvenor-square, W., and Wentworth-house, Rotherham, Yorkshire.
1865	650*Fitzwilliam, Wm. S. Esq. 28, Osmington-square, Brompton, S.W.
1863	Fleming, G., Esq. Brompton Inns, Chatham.
1861	*Fleming, John, Esq. 18, Fendall-street, E.C.
1865	Fleming, Rev. T. S. Roscoe place, Cheltenham-road, Leeds.
1857	*Fleming, Rev. Francis P. Glenferkin, near Halesburgh, Glasgow.
1862	Fletcher, John Charles, Esq. Dale-park, Arundel; and Eaton-place, S.W.
1857	Fletcher, Thomas Kedday, Esq. Farm-lane, Finsbury, E.
1866	Flood, John Edwin, Esq. 126, High-street, Poplar, E.
1864	Flower, Capt. L. 19, Great College-street, S.W. Elmstead, Surrey; and Queen's Hotel Service Club, N.W.
1863	Foley, Col. the Hon. St. George, C.B.
1864	690 Ford, John Bromley, Esq. 52, Old Broad-street, E.C.
1860	Forbes, Commander Charles S., M.A. Army and Navy Club, S.W., and 11, Jamaica-street, Buckingham-gate, S.W.
1863	Forbes, Capt. C. J. V. Smith. 5, Hatch-street, Dublin.
1867	Forbes, Geo. Edward, Esq. New Club, Edinburgh; of Clinton District, West Moriston, Riverland, district of Kennedy, carpenter, Queensland. Son of J. B. Edinburgh and Co., 54, Morgan-street, E.C.
1860	Forbes, the Hon. Horace Courtenay, M.A. Christ College, Oxford.
1845	Forster, Rev. Charles, M.D. States-rectory, Essex.
1859	*Forster, William Edward, Esq., M.P. Lundy, near Olney.
1864	Forrest, J. Douglas, Esq., C.B. (R.C.S.) Commissioner, Inland Revenue, Deputy Chief of Messrs. Smith, Elder, and Co., 65, Cornhill, E.C.
1861	Forrest, William, Esq., M.P., M.C. 61, Rutland-gate, S.W.
1864	Fort, Richard, Esq., M.P. Lead-hall, Whalley, Lancashire; and 21, Queen's-gate, Kensington, W.
1858	700 Fortescue, Chester S., Esq., M.P. 1, Carlton-gardens, S.W.
1864	*Fortescue, Hon. Dudley F., M.P. 8, Bedford-street, W.
1865	Foster, Edmund, Esq., Jun. 9, Albion-street, Hyde-park, W.
1864	Foster, H. J., Esq.

Year of
Election

- 1854 Foster, Capt. W. J. *Stubington-house, Farcham, Hants.*
- 1853 *Fowler, J. T., Esq. *Government Inspector of Schools, Adyar, Madras, India.*
Care of Rev. A. Wilson, National Society's Office, Sanctuary, Westminster.
- 1850 *Fowler, Robert N., Esq., M.A. 50, *Cornhill, E.C.; and Tottenham, N.*
- 1861 Fox, Arthur Douglas, Esq., C.E. 135, *Marine Parade, Brighton; and 8, New-street, Spring-gardens, S.W.*
- 1859 Fox, Lieut.-Colonel A. Lane. 10, *Upper Phillimore-gardens, Kensington, W.*
- 1830 *Fox, Lieut.-General C. R. *Travellers' Club, S.W.; and 1, Addison-road, Kensington, W.*
- 1866 710 Fox, D. M., Esq., Chief Engineer of the Santos and St. Paulo Railway. *St. Paulo, Brasil.*
- 1864 *Fox, F. E. Esq., B.A. *Elmlea, Tottenham, Middlesex.*
- 1865 Fox, Samuel Crane, Esq. *Woodford-house, Granville-park, Blackheath, S.E.*
- 1861 Franklin, Joseph Lewis, Esq. 148, *New Bond-street, W.*
- 1865 *Franks, Aug. W., Esq. 55, *Upper Seymour-street, W.*
- 1860 Franks, Charles W., Esq.
- 1854 Fraser, Charles, Esq. 15, *Lancaster-gate, Bayswater-road, W.*
- 1867 Fraser, Edward John, Esq. (Solicitor). 1, *Percy-villas, Campden-hill, Kensington, W.*
- 1862 Fraser, Com. H. A., R.N.
- 1860 Fraser, Thos., Esq.
- 1866 720 Fraser, Capt. T. *Otago, New Zealand.*
- 1866 Freeman, Daniel Alex., Esq., Barrister-at-law. *Plowden-buildings, Temple, E.C.*
- 1864 Fremantle, Lieut.-Col. Arthur. *Guards' Club, S.W.*
- 1863 Fremantle, Captain Edmund Robert, R.N. 4, *Upper Eccleston-street, S.W.*
- 1866 Fremantle, Rt. Hon. Sir Thomas F., Bart. 4, *Upper Eccleston-street, Belgrave-square, S.W.*
- 1864 Frema, Major James H. *Wrentnall-house, Shropshire; and Army and Navy Club, S.W.*
- 1850 Frere, Bartle John Lanrie, Esq. 45, *Bedford-square, W.C.*
- 1866 *Frere, George, Jun., Esq. *Cape of Good Hope; and 45, Bedford-square, W.C.*
- 1867 Frere, Sir Hy. Bartle Edw., K.C.B., G.C. Star of India. 44, *Princes-gardens, W.*
- 1862 Frere, William Edw., Esq., F.R.S.E. *Bombay; and 42, Clarges-street, W.*
- 1855 730 Frith, John Griffith, Esq. 13, *Wimpole-street, W.; and 11, Austin Friars, E.C.*
- 1859 Fryer, William, Esq. 39, *Marlborough-hill-gardens, St. John's-wood, N.W.*
- 1863 Fudge, William, Esq. 5, *Park-row, Bristol.*
- 1866 Fuller, Thomas, Esq. 119, *Gloucester-terrace, Hyde-park, W.*
- 1860 Fussell, Rev. J. G. Curry. 16, *Cadogan-place, S.W.*
- 1861 Fynes Clinton, Rev. Charles J., M.A. 3, *Montague-place, Russell-square, W.C.; and Cromwell, Notts.*
- 1866 Fytche, Colonel Albert. *Reform Club, S.W.*
- 1863 *Gabrielli, Antoine, Esq. 6, *Queen's-gate-terrace, Kensington, W.*

Year of Election	
1858	Gausford, Thomas, Esq. <i>Travellers' Club, S.W.</i>
1861	Gallagher, John, Esq., M.D. <i>Reform Club, S.W.; and 109, Westbourne-terrace, W.</i>
1855	74* Galloway, John James, Esq.
1848	*Galtou, Capt. Douglas, R.N. 12, Chester-street, Grosvenor-place, S.W.
1850	*Galtou, Francis, Esq., M.A., F.R.S. 42, Batford-gate, S.W.; and 5, Berwick-terrace, Leamington.
1854	*Gammell, Major Andrew. <i>Drumchilly, Kincardineshire, N.N.</i>
1861	Garden, Robert Jones, Esq. 30, Cuthbert-road, South Kensington, S.W.
1865	Gardner, Capt., G. H., R.N. <i>Cadet-Guard-office, Spring-gardens, S.W.</i>
1866	Gardner, John Dunn, Esq. 122, Park-street, Park-lane, W.
1861	Gaucosgne, Frederic, Esq. <i>Perthington, Warwickshire</i>
1856	*Garnot, John P., Jun., Esq. 6, Smeaton-place, Regent's-park, N.W.
1866	Chastrell, Lieut.-Col. James E. (4. 5th Corps) <i>Surgeon-General's Office, Chelsea</i>
1861	750* Gatty, Charles H., Esq., M.A., <i>Felbridge-park, East Grinstead, Sussex.</i>
1868	*Gawler, Colonel George, R.N. <i>United Service Club, S.W.; and Southsea-castle, Southampton.</i>
1865	George, H. B., Esq. 63, Lincoln's-inn-fields, W.C.
1858	Gershenberg, Isidore, Esq. 11, Warrford-court, Throgmorton-street, E.C.
1865	*Gibbons, Silas John, Esq., Alderman. 13, Upper Bedford-place, Russell-square, W.C.
1866	*Gibb, George Henderson, Esq., 13, Victoria-street, Westminster, S.W.
1866	*Gibbs, H. Hicks, Esq. 81, Dunstan's, Regent's-park, N.W.
1864	Gibson, A., Esq. <i>Achimbrooch, Brechin, N.B.</i>
1866	Gibson, John, Esq. 7, Piccadilly, Grosvenor, Park-lane; and 2, Melbourn-court, Grosvenor, W.C.
1855	Gillies, Alexander, Esq. <i>Heathfield, Walton-on-Thames, Surrey.</i>
1866	760* Gillespie, William, Esq. (of Torbarn-hill), 46, Melville-street, Edinburgh.
1857	Gilguy, Thomas, Esq. <i>Brabant-court, Finsbury, E.C.</i>
1868	*Gillis, William, Esq. 61, Albany, W.
1861	Gillett, Alfred, Esq. <i>Longham-house, near Wimborne, Dorset.</i>
1863	Gilhes, Robert, Esq., M.A. <i>Dunedin, Otago, New Zealand.</i>
1867	Gisborne, Fred. N., Esq. Engineer and Electrician. 445, West Strand, W.C.
1866	Gladish, Col. William. <i>Byeliffes, Graysand.</i>
1864	Gladstone, George, Esq. <i>The Terrace, Clapham-common, S.</i>
1863	Gladstone, J. E., Esq., Ph.D. 17, Pembroke-square, W.
1862	*Gladstone, Robert Stuart, Esq. 11, New Broad-street, E.C.
1848	770* Gladstone, William, Esq. 57, Old Broad-street, E.C.
1864	*Gladstone, W. K., Esq. 35, Old Broad-street, W.; and Fitzroy-park, Highgate, N.
1860	Glascott, Commander Adam Gifford, M.A., Acting Commissioner on the Turko-Persian Frontier. <i>Messrs. Child & Clifford, 10, Fleet-street, E.C.</i>
1867	Giles, H. A., Esq. 4, Grosvenor-square, W.C.
1857	Glegg, Rev. G. R., M.A. <i>Chaplain-General, Chelsea-hospital, S.W.</i>

Year of Election.	
1854	Glen, Joseph, Esq., Mem. Geogr. Soc. of Bombay. <i>Oriental Club, W.</i>
1857	Glover, Commr. John H., R.N. <i>Lagos; and Army and Navy Club, S.W.</i>
1866	Glover, Robert Beaveley, Esq. 80, <i>Great St. Helen's, E.C.</i>
1860	Glyn, Capt. H. Carr, R.N. 1, <i>Eccleston-street, Belgrave-square, S.W.</i>
1864	Glyn, Sir Richard George, Bart. <i>Army and Navy Club, S.W.</i>
1862	780 Goddard, James, Jun., Esq. 14, <i>Mincing-lane, E.C.</i>
1863	Goldsmid, Lt.-Colonel Frederick John. <i>Harrow-on-the-hill; Southborough, Kent; and United Service Club, S.W.</i>
1861	Goldsmid, Julian, Esq. 20, <i>Portman-square, W.</i>
1860	Gooch, Thomas Longridge, Esq. <i>Team-lodge, Saltwell, Gateshead-on-Tyne.</i>
1864	Goodall, George, Esq. <i>Messrs. Cox and Co., Craig's-court; and Junior Carlton Club, W.</i>
1867	*Goodenough, Fred. Addington, Esq. 4, <i>Leinster-gardens, W.</i>
1863	*Goodenough, Capt. J. G., R.N. <i>U. S. Club, S.W. Care of Messrs. Stillwell, 22, Arundel-street, Strand, W.C.</i>
1864	*Goodenough, Major W., R.A. <i>Royal Artillery, Aldershot.</i>
1861	Gooldin, Joseph, Esq. 48, <i>Upper Hyde-park-gardens, W.</i>
1856	*Gordon, Colonel the Hon. Alexander H., C.B.
1854	790 Gordon, Harry George, Esq. 1, <i>Clifton-place, Hyde-park-gardens, W.; and Killybegs, Dunblair, Perthshire.</i>
1856	Gordon, Admiral the Honourable John. 28, <i>Queen Anne-street, W.</i>
1853	Gordon, Vice-Admiral Robert. <i>United Service Club, S.W.</i>
1853	Gore, Richard Thomas, Esq. 8, <i>Queen-square, Bath.</i>
1859	Goaling, Fred. Solly, Esq. 18, <i>New-street, Spring-gardens, S.W.</i>
1862	Goss, Samuel Day, Esq., M.D. 111, <i>Kennington-park-road, S.</i>
1835	Gould, Lieut.-Colonel Francis A. <i>Buntingford, Herts.</i>
1846	Gould, John, Esq., F.R.S., F.L.S. 26, <i>Charlotte-street, Bedford-square, W.C.</i>
1865	Gowen, Colonel J. E.
1867	Graham, Michael, Esq., M.D. <i>Madeira. Care of C. R. Blandy, Esq., 25, Crutched Friars, E.C.</i>
1858	800 Graham, Cyril C., Esq. 9, <i>Cleveland-row, St. James's, S.W.; and Debroe-house, Watford, Herts.</i>
1861	Grant, Alexander, Esq. <i>Oakfield-house, Hornsey, N.</i>
1861	Grant, Daniel, Esq. 11, <i>Warwick-road, Upper Clapton, N.</i>
1865	*Grant, Francis W., Esq. <i>Army and Navy Club, S.W.</i>
1860	Grant, Major James A., C.B. <i>E. India U. S. Club, S.W.; and Dingwall, Ross-shire, N.B.</i>
1862	Grant, Lieut. J. M. (late 25th Reg.) <i>East London, Cape of Good Hope.</i>
1860	Grantham, Capt. James, R.E. <i>Scarsby, Brigg, Lincolnshire; and Royal Engineer Office, Devonport.</i>
1830	*Gray, John Edw., Esq., PH. DR., F.R.S., Z.S. and L.S. <i>British Museum W.C.</i>
1862	Grathed, Lieut.-Colonel Wilberforce, W. H., C.B.
1863	Graves, Rev. Richard W. 1, <i>Whitehall-gardens, W.</i>

Year of Election	
1841	810 Gurno, Capt. Francis. 89, Euston-square, S.W.
1844	Greene, Thomas, Esq. Watlington-hall, near Burton, Westmoreland.
1847	*Greenfield, W. R., Esq. 50, Foxchester-terrace, Hyde-park, W., and Union Club, S.W.
1848	Greg, W. R., Esq., Comptroller of H.M.S. Stationery Office. Windiesden, S.W.
1848	Gregory, Charles Hutton, Esq., C.E. 1, Delahay-street, Westminster, S.W.
1860	*Gregory, Francis Thomas, Esq. Queensland.
1858	*Gregory, Isaac, Esq. Chorlton Hall, Victoria-park, Manchester.
1857	*Grellet, Henry Robert, Esq. Savoy-gardens, Tower-hill, E.C.
1865	Greenfield, Henry R., Esq., M.R. 15, St James's place, S.W.
1858	Greenfell, Pascoe St. Leger, Esq. Maesteg-house, Swansea.
1853	820 Greenfell, Riverdale W., Esq. 27, Upper Thames street, E.C.
1850	*Greswell, Rev. Richard, M.A., F.R.S. 39, St. Giles, Oxford
1846	Grey, Charles, Esq. 13, Carlton-house-terrace, S.W.
1837	*Grey, Sir George, K.C.B. Governor and Commander-in-Chief, New Zealand. Colonial Office.
1844	*Grier, Ralph Wm., Esq., Commissioner of Customs. 47, Delgrave-square, S.W., and Church-house-coast, Heston.
1844	Grierson, Charles, Esq.
1862	Griffin, James, Esq. The Retreat, Portico and The Hard, Portico, Hants
1851	*Griffith, Daniel Clement, Esq. 20, Gower-street, W.C.
1838	Griffith, John, Esq. 10, Kingsbury-place-north, E.C.
1863	Griffith, Sir Richard 20, Euston-square, S.W.
1846	830 Griffith, Richard Clewin, Esq. 20, Gower-street, W.C.
1867	Griffiths, Captain A. G. P. 6th Reg. Major of Brigade, Gibraltar, (Care of E. S. Gidd, Esq., 25, Gower-street, Strand, W.C.)
1855	Grindrod R. B., Esq., M.D., F.R.S., &c. Townsend-house, Merton.
1894	Grinnell, C., Esq. Burnhamton-chambers, 180, Piccadilly, W.
1881	Grosvenor, Lord Richard, M.P. 33, Upper Grosvenor-street, W.
1858	Grote, George, Esq. 12, Scarsborough, W.
1857	Gruneison, Charles Lewis, Esq. 16, Surrey-street, Strand, W.C.
1801	Guise, Commander Edmund H., R.N. Army and Navy Club, S.W.; 21, Argyll-road, Campden-hill, W.
1850	*Gurney, John H., Esq. Galtton-hill, Norfolk.
1857	Gurney, Samuel, Esq., M.R. 20, Hanover-terrace, Regent-park, W.; and Carshalton, Surrey.
1863	840 Guthrie, James Alexander, Esq. 30, Portland-place, W.
1865	Gwyther, John H., Esq. Mindocroft, Lower Sydenham.
1863	Hadfield, Wm., Esq.
1865	Hadley, Henry, Esq., M.D. Needwood-lodge, Bay's-hill, Chertisium.

Year of
Death.

- 1863 Hadow, P. D., Esq. *Sudbury-priory, Middlesex.*
- 1865 Halcombe, Rev. J. J. *Charter-house, E.C.*
- 1865 Hale, Warren S., Esq., Alderman. 71, *Queen-street, Cheapside, E.C.*
- 1860 Haliday, Lieut.-Colonel William Robert. *United Service Club, S.W.*
- 1853 Halifax, Viscount, G.C.B., M.P. 10, *Belgrave-square, S.W.; and Hichleton, Yorkshire.*
- 1853 *Halkett, Rev. Dunbar S. *Little Bookham, Surrey.*
- 1853 850* Halkett, Lieut. Peter A., R.N. *Windham Club, S.W.*
- 1861 Hall, Charles Hall, Esq. *Park-street, Gloucester.*
- 1863 Hall, Henry, Esq. 109, *Victoria-street, S.W.*
- 1862 Hall, James Tebbutt, Esq. *Fore-street, Limehouse, E.*
- 1863 Hall, Thomas F., Esq., F.C.S. 29, *Warwick-square, S.W.*
- 1853 Hall, Admiral Sir William Hatcheson, K.C.B., F.R.S. *United Service Club, S.W.; and 48, Phillimore-gardens, Kensington, W.*
- 1865 Hallett, Lieut. Francis C. H., R.N.A. *Junior United Service Club, S.W.*
- 1864 Halliday, Sir Fred., K.C.B. 14, *Queen's-gate-gardens, South Kensington, W.*
- 1858 Halloran, Arthur B., Esq. *Principal of the South Devon Collegiate School, Exeter.*
- 1862 Hamilton, Archibald, Esq. *South Barrow, Bromley, Kent, S.E.*
- 1866 860 Hamilton, Rear-Admiral C. Baillie. 50, *Warwick-square, S.W.*
- 1861 Hamilton, Lord Claude, M.P. 19, *Eaton-sq., S.W.; and Barons-court, Co. Tyrone.*
- 1830 *Hamilton, Capt. Henry G., R.N. 71, *Eccleston-square, S.W.*
- 1861 Hamilton, Col. Robert William, Grenadier Guards. 18, *Eccleston-square, S.W.*
- 1863 Hamilton, R., Esq. *Care of J. Forster Hamilton, Esq., 2, Gloucester-street, Portman-square, W.*
- 1830 Hamilton, Terrick, Esq. 121, *Park-street, Grosvenor-square, W.*
- 1866 Hamilton, Rear-Admiral W. A. Baillie. *Macartney-house, Blackheath, S.E.*
- 1853 *Hand, Capt. George S., R.N., C.B. *United Service Club, S.W.; and H.M.S. 'Victory.'*
- 1860 *Handley, Benjamin, Esq., Assistant-Commr. Turko-Persian Frontier. *British Embassy, St. Petersburg; and Grafton Club, Grafton-street, W.*
- 1866 Hanham, Commr. T. B., R.N. *Manston-house, near Blandford, Dorset.*
- 1861 870* Hankey, Blake Alexander, Esq. 38, *Portland-place, W.*
- 1857 Hankey, Thomson, Esq., M.P. 45, *Portland-place, W.*
- 1837 *Hanmer, Sir J., Bart., M.P., F.R.S. *Hammer-hall and Bettisfield-park, Flintshire.*
- 1865 *Harcourt, Henry, Esq. 13, *Great Queen-street, W.C.*
- 1840 *Harcourt, Egerton V., Esq. *Whitwell-hall, York.*
- 1864 *Harden, Gavin, Esq. 113, *Piccadilly, W.*
- 1864 Harding, Charles, Esq., F.R.S.L., F.R.S., F.A.S.L. *Grafton Club, 10, Grafton-street, Piccadilly, W.*
- 1864 Harding, J. J., Esq. 1, *Barnsbury-park, Islington, N.*
- 1864 Hardinge, Capt. E., R.N. 32, *Hyde-park-square, W.*
- 1861 Hardinge, Henry, Esq., M.D. 18, *Grafton-street, Bond-street, W.*
- 1862 880 Hardman, William, Esq., M.A. *Norbiton-hall, Kingston-on-Thames.*

Year of Election	
1854	Hardwick, B. Esq. 15 th , Fenchurch-street, E.C.
1855	Harris, A. children the Hon. C. A. Dromit-scarage, Chappenharn.
1856	Harris, Admiral the Hon. R. A. J., C.B. H.B.M.'s Envoy Extraordinary and Minister Plenipotentiary, Legation Brabantine, Berne Messrs Woodard.
1857	Harris, George Frederick, Esq., M.A. Harrow-park, Middlessex, N.W.
1859	Harris, Capt. Henry, R.C.S. 35, Gloucester-terrace, Hyde-park, W.
1865	Harris, John M., Esq. 12, Holland-terrace, Holland-road, Kensington, W.
1868	Harrison, Chas., Esq. Laverie-park, Ealingham; and 3, Great Tower-st., E.C.
1865	*Hartley, William, Esq., F.R.S., F.S.A., &c. Omartine Club, S.W.; Royal Thames Yacht Club 7 Abchurch-lane, W.; Gainsborough, near Black-burn, Lancashire; and Sandlebury-hill, near Preton, Iwereshire
1868	Harrowby, Dudley, Esq. of Sandon-ho., Lichfield, and Norton, Gloucestershire.
1864	875*Hartwood, F. Esq., F.R.S., &c. The Arkwold, near Cheltenham.
1863	Harvey, Charles, Esq. Bickley-cottages, Eritatham, S.
1865	Harvey, C. H., Esq., M.D. 17, Whitcomb-place, S.W.
1867	Harvey, James, Esq. (Sonnet). Esk-street, Invercargill Southland, New Zealand. Care of the Bank of Otago, Out Broadstreet, F.C.
1864	Harvey, John, Esq. Ickwell Bury, Bylesmeade.
1864	Harvey, John, Esq. 7, Alving-lane, E.C.
1866	Harvey, Richard M., Esq. Oxford and Cambridge Club, S.W.
1864	Harvey, W. D., Esq. 32, Notting-hill-square, S.W.
1859	Harwood, H. Harwood, Esq. 29, Cleveland-square, Hyde-park, W.
1858	Hawker, Edward J., Esq. 37, Cadogan-place, S.W.
1854	900 Hawkins, Francis Basset, Esq., M.D., F.R.S. 26, Upper Harley-street, W.; and Leaveland, Dorchester.
1857	Hawkins, Capt. Frank K., R.N. Army and Navy Club, S.W.
1847	*Hawkins, John, Esq.
1858	*Hawkins, Col. J. Summerfield, R.E. Woolrich, S.B.
1861	Hawesley, Thomas, Esq., C.M. 14, Phillimore-gardens, Kensington, S.W.
1860	Haworth, Frederick, Esq.
1852	*Hay, Rear-Admiral Sir J. C. Dalrymple, Bart., M.P., F.R.S. 108, St. George's-square, S.W.; U.S. Club, S.W.; Dunragit, Glenelg, and Harrow-on-the-Hill, N.W.
1863	*Hay, Lord John. 15, Cromwell-road, South Kensington, W.
1865	Hay, Lord William. 2, Cleveland-row, S.W.
1859	Hay, Major W. E. Linden-hedge, Loan-head, near Edinburgh.
1864	910 Hayman, James, Esq. Burdett-house, Burdett-road, F.
1862	Head, Alfred, Esq. 13, Crutche-hill-gardens, Lagonator, W.
1863	Headlam, Right Hon. Thos. E., M.P. 27, Ashley-place, Victoria-street, S.W.
1856	Heath, J. Benj., Esq., F.R.S., F.A.S., Consul for Sarina. 31, Old Ferry, E.C.
1867	Heathcote, Charles George, Esq. 40, Pall-mall, S.W.
1863	Heathfield, W. E., Esq. 20, King-street, St. James's, S.W.
1861	Heator, Alexander, Esq. 8, Stoncy-gardens, Baywater, W.

Year of
Birth.

- 1851 Hector, James, Esq., M.D. *Care of 2, Strand, Eng.*
- 1862 Hernace, Geo. Wilmughby, Esq., O.E. 15, *Queen's-square, Westminster, S.W.*
- 1866 Henderson, Andrew, Esq. 112, *Gloucester-place, Portman-square, W.*
- 1867 920* Henderson, James, Esq. *Littewood-park, Fife, Aberdeenshire.*
- 1868 Henderson, John, Esq. *Conservators Club, S.W.; and Victoria.*
- 1866 Henderson, Patrick, Esq. *Care of Captain H. J. Street Esq., Mail Steam Packet Company, Southampton.*
- 1864 Henderson, R., Esq. 7, *Albany-street, F.C.*
- 1862 Henderson, William, Esq. 5, *Stanhope-street, Hyde-park gardens, W.*
- 1844 *Heslop, Edward, Esq. *Slap-land, Hemel Hempstead.*
- 1867 Hess, Rev. J., F.R.S., Head Master of the Manchester Commercial School. 65 *Tragford, Manchester.*
- 1866 Hearnshaw, J. B. N., Esq. 1st Asst. Secy Survey of India, *Dehra in the Hills, N.W. Provinces, India. Care of Messrs. Smith, Elder, and Co.*
- 1868 *Henry, Wm. Chas., Esq., M.D., F.R.S. *Hugfield, near Ladbury, Herefordshire.*
- 1860 *Henry, Douglas, Esq. *Chichester.*
- 1864 530 Herbert, George, Esq., F.R.S. *University School, near Nottingham.*
- 1862 Herd, Captain D. J. 2, *Norwy-house, Limehouse, E.*
- 1863 Hertel, Edward, Esq. *Librarian, Foreign Office, S.W.; and Belle-rue-house, Richmond, S.W.*
- 1861 Henry, James Augustus, Esq. *Manningford Bruce, Poultry, Wiltz.*
- 1861 Heng, John, Esq. *Timbraig-wells.*
- 1860 *Heywood, James, Esq., F.R.S. *Athenaeum Club, S.W.; and 28, Kennington-palace-gardens, W.*
- 1860 Heyworth, Capt. Lawrence, 4th Royal Lancashire. *Jun. United Service Club, S.W.*
- 1863 Hickry, Edwin A., Esq. 29, *King-street, St. James's, S.W.*
- 1867 Higgins, Edmund Thomas, Esq., M.B.E. 8, *Freemantle-terrace, Harnbury, N.*
- 1862 Hill, Arthur Bowdler, Esq. *South-wood, Clapham-park, Surrey, S.*
- 1860 921 Hill Barkley, Esq. 14, *Waymouth-street, Portman-square, W.*
- 1861 Hill, O'Dell Teniers, Esq. 19, *Kilbuck Terrace, Westbourne Park, W.*
- 1864 Hill, Lieut. Colonel Stephen J. *Care of Capt. A. Burnett, R.N., 14, Wolburn-square, W.; Army and Navy Club, S.W.; and Governor of Antigua.*
- 1865 Hill, Samuel S., Esq. *Reform Club, S.W., and 37, Backwell-st., Finsbury, W.*
- 1861 Hillard, Major George Towers, *Mulree Staff Corps. 11, Lonsdown-road, Kensington-park, Notting-hill, W.*
- 1868 Hinchliff, T. Woodbine, Esq., Barrister-at-Law. 64, *Lincoln's-inn-fields, W.C.*
- 1863 Hind, Professor Henry Youle, M.A. *Toronto, Canada West.*
- 1862 *Hinde, Samuel Henry, Esq. *Wentham Club, S.W.*
- 1864 *Hindmarsh, Frederick, Esq. 4, *New Inn, Strand, W.C.*
- 1862 Hoare, Duane John, Esq. *Royal Thames Yacht Club, Antennae-street, W.*
- 1860 950 Hobbs, Wm. Geo. Ed., Esq. *Master of Grammar School, Worcester, near Ware.*
- 1860 *Hobhouse, Henry William, Esq. 24, *Colindale-place, N.W.*
- 1868 Hockley, John Minett, Esq., M.B. *Harbour Master, Shanghai, and Conservator of the Yang-tze-Kiang River. Pipington St. Mary, Devon.*

Year of Election.	
1851	*Hodgson, Arthur, Esq., Superintendent of the Australian Agricultural Company.
1861	*Hodgson, James Stewart, Esq., B. St. Helen's-place, E.C.
1857	Hodgson, Kirkman Daniel, Esq., M.P., St. Helen's-place, E.C.
1850	Hogg, James, Esq., 217, Piccadilly, W.
1850	Hogg, John, Esq., M.A., V.R.S., &c. V.-Pres. Royal Society of Literature, Sec. N, Sergeants'-hall, Temple, E.C., and Norton-house, Stockton-upon-Tees.
1865	Hole, Charles, Esq., Loughborough-house-school, East Briston, S.
1830	*Holford, Robert S., Esq., M.P., Dorchester-house, Park-lane, W.
1857	960 Holland, Rev. Fred. Whitmore, B, Portico-place, Connaught-square, W.
1830	Holland, Sir Henry, Bart., M.D., F.R.S., 25, Lower Brook-street, W.
1851	Holland, Colonel James, 24, France's-square, Kensington-gardens, W.
1862	Holland, Loton, Esq., 6, Queen's-villas, Windsor.
1862	Holland, Robert, Esq., Stammer-hall, Great Marston, Middlesex.
1861	*Hollingsworth, John, Esq., M.B.E., Mandatone-house, Greenwich, S.E.
1861	Holme, J. Wilson, Esq., M.A., Downwood, Beckenham, Kent, S.E.
1833	*Holmes, James, Esq., 4, New Ormond-street, Queen-square, W.C.
1862	Holmes, Sir William H.
1861	Holmes, John, Esq., 10, Cornwall-gardens, Queen's-gate, W.
1859	970*Holroyd, Arthur Todd, Esq., M.D., F.R.S., Athenaeum Club, S.W.
1857	Holroyd, Henry, Esq., Barrister-at-law, 7, Elm-court, Temple, E.C.
1864	Holt, Vasey, Esq., 60, Wimpole-square, W.
1857	Houlmy, William Henry, Esq., 0, Storey's-square, S.W.
1865	Honeywood, Robert, Esq., Manor-house, Wetherfield, Duncton; Windham Club, S.W.
1864	*Hood, Sir Alex. Archd., Bart., M.P., St. Andrew's-park, Brighthelm, Sussex.
1862	Hood, Henry Schaback, Esq., War Office, S.W.; and 10, Kensington-park-gate, W.
1861	Hood, F. H. Cockburn, Esq., Stoneridge, Richmondshire.
1859	*Hood, William Charles, Esq., M.D., Bethlehem Hospital, E.
1866	*Hooper, Joseph, Esq., M.D., F.R.S., &c., Director of the Royal Gardens, Kew.
1881	980 Hopcraft, George, Esq., 3, Pilcher-square, E.C.
1846	*Hope, Alex. James Horrocks, Esq., M.P., Arklow-house, Connaught-place, Hyde-park, W.; and Bedgubury-park, Herts-green Kent.
1862	Hope, Capt. C. Welby, M.A., H.M.S. 'Buck', Australia, Messrs. Hallett & Co.
1861	Hooken, Capt. A. H., R.N., Army and Navy Club, S.W.
1859	Hooken, Charles Wren, Esq., Walsingham, Warwickshire.
1853	Houghton, Louis, 16, Upper-brook-street, W.; The Hall, Hauxley; and Fyfeon-hall, Ferrybridge, Yorkshire.
1856	Howell, William Hilton, Esq., Goulburn, New South Wales, Care of Mr. W. Chamberlain, 74, Fleet-street, E.C.
1864	Howels, W. G., Esq.
1853	Howard, Sir Ralph, Bart., 17, Belgrave-square, S.W.; and Bushy-park, Wicklow.
1857	Howard, Samuel Lloyd, Esq., Goldings, Loughton, Essex.

Year of
Election.

- 1842 990*Hubbard, J. Gallibrand, Esq., M.P. 24, *Prince's-gate, Hyde-park, S. W.*
 1867 *Hubbard, William Egerton, Esq. *St. Leonard's-lodge, Horsham.*
 1867 *Hubbard, William Egerton, Esq., Jun., R.A. *St. Leonard's-lodge, Horsham.*
 1857 Hughes, Capt. Sir Frederic. *Ely-house, Wexford.*
 1857 Hughes, William, Esq. 63, *Oakley-square, St. Pancras, N. W.*
 1838 *Hume, Edmund Kent, Esq.
 1860 *Hume, Hamilton, Esq. *Cooma Pass, New South Wales. Care of Rev. A. Hume, 24, Fitzclarence-street, Liverpool.*
 1861 Hunt, George S. Lennox, Esq., H.B.M. Consul, *Pernambuco.*
 1861 Hunt, Joseph, Esq. *Case-house Uxbridge, Middlesex.*
 1865 Hunt, Capt. Thomas, R.A. *The Barracks, Maidstone.*
 1857 1000Hunt, Zacharias Daniel, Esq. *Aylebury.*
 1857 Hunter, Henry Lannoy, Esq. *Beach-hill, Reading.*
 1864 Hutchinson, Capt. R. R. 12, *Mornington-road, Bramley, Middlesex.*
 1858 Hutchinson, Thomas J., Esq., F.R.S.L., F.R.S., F.A.S.L., H.B.M. Consul, *Rosario, Argentine Republic. Care of J. B. Alston, Esq., Foreign-office.*
 1860 *Hyde, Captain Samuel. 8, *Billiter-square, E. C.*
- 1865 Illingworth, Rev. Edward A. 3, *Mecklenburg-street, W. G.*
 1852 Illingworth, Richard Stonhewer, Esq. 9, *Norfolk-crescent, Hyde-park, W.*
 1850 *Imray, James Frederick, Esq. 102, *Minories, E.; and Beckenham, Kent, S. E.*
 1861 *Inglall, Samuel, Esq. *Forest-hill, Kent, S. E.*
 1860 Ingilby, the Rev. Sir Henry John, Bart. *Ripley-castle, Ripley, Yorkshire.*
 1851 1010Inglefield, Captain Edward A., R.N., F.R.S. *United Service Club, S. W.; and 10, Grove-end-road, St. John's Wood, N. W.*
 1846 Ingram, Hughes Francis, Esq. *University Club, S. W.*
 1846 *Inskip, G. H., Esq., Master R.N. *H.M. Surveying Vessel 'Porcupine,' and 6, Park-place-west, Sunderland.*
 1852 *Inskip, Rev. Robert Mills. 8, *Boon's-place, Plymouth.*
 1840 *Irby, Frederick W., Esq. *Athenæum Club, S. W.*
 1844 *Irving, John, Esq.
 1844 Irving, Thomas, Esq. 46, *Marquess-road, Canonbury, N.*
 1861 Irwin, James V. H. 8, *Duke-street, St. James's, S. W.*
 1864 Ives, W. F., Esq. *St. John's School, Limehouse, E.*
 1865 Izard, Frederick, Esq., 141, *High Holborn, W. C.*
- 1866 1020Jackson, Robert Ward, Esq. 28, *Inverness-road, Hyde-park, W.*
 1855 Jackson, William, Esq., M.P. 10, *Mansfield-street, W.*
 1862 Jacobb, Thomas, jun., Esq. 23, *Old Broad-street, Gresham-house, E. C.*
 1866 James, Major Geo. A. 22, *Essex-street, Strand, W. C.*
 1857 James, Colonel Sir Henry, R.E., F.R.S. *Director of the Ordnance Survey, Southampton.*

Year of Election	
1801	James, William Beaville, Esq. 13 Blomfield-road, Abchurch-lane, W.
1812	*Jacques, Leonard, Esq. Wentworth-house, Pontefract, Yorkshire
1813	*Jardine, Andrew, Esq. Larbert castle, Stirling.
1815	*Jardine, Robert, Esq., M.P. Castlemilk, Locherby, N.B.
1817	Jederson, Richard, Esq. 44, The Albany, W.
1818	1030 Jeffreys, J. G., Esq. 23, Devonshire-place, W.
1819	*Jeyebhoy, Sir Jambhjee, Bart. Bombay.
1824	Jellison, Charles, Esq. 12, Grosvenor-place, W.
1830	Jencken, H. Dietrich, Esq. 1, Birch-croft, Temple, E.C., and 2, York-terrace, Upper Sydenham, S.E.
1834	Jenkins, Capt. Griffith, M.C., C.M. East India Club, St. James's-square, S.W., and Doreen, Welsh Pool, Montgomeryshire.
1837	*Jenkins, R. Castle, Esq. Beachley, near Chepstow
1851	*Jennings, William, Esq., M.A. 13, Victoria-street, Westminster, S.W.
1860	Jermyn, Rowland Forinly, Esq. War office, S.W.
1860	Jessop, Rev. Augustus, M.A., Head Master, King Edward VI. school. Norwich.
1864	*Jenks, Henry, Esq. Lloyd's E.C.
1864	1040 Jeyes, P. F., Esq. Castle-hill, Ealing, W.
1847	Johnson, Edmund Chas., Esq. 6, Albany, Piccadilly, W., and 6, Savile-row, W.
1859	*Johnson, Henry, Esq. 39, Crutched-fruere, E.C.
1854	Johnson, John Hugh, Esq.
1861	Johnson, Nelson, Esq., M.P. Junior Carlton Club, S.W.
1868	Johnson, W. H., Esq., Civil Assistant to the S. India India Post, N.W. Province, India.
1843	Johnston, Alex. Keith, Esq., F.R.S.E., Hon. Mem. Berl. Geog. Soc., &c. Merchants'-park; and 4, St. Andrew-square, Edinburgh
1856	Johnston, A. R., Esq., F.R.S. Almackian Club, S.W.
1857	Johnston, J. Brooke, Esq. 29, Lombard-street, E.C.
1866	Johnstone, Major H. C. Murree, Punjab, India.
1867	1050 Johnstone, John, Esq. Castlemead-house, Mortlake, S.W.
1853	Johnstone, Sir John V. B., Bart., M.P., D.C.L. 34, Belgrave-square, W.; and Hazebush-hill, near Scarborough.
1858	Jones, Capt. Edward Monckton, 20th Regt. Adjutant, Staff College, near Winchester Station, Hants.
1864	Jones, Capt. Felix, Fernside, Church-road, Weymouth, Upper Norwood, S.
1857	Jones Lt.-Colonel Jenkin, Royal Engineers. 1, Lennard-place, Cannon-row, St. John's-wood, N.W., and India.
1865	Jones, John, Esq. 338, Strand, W.C.
1861	Jones, John Pryce, Esq. Grove-park School, Wrexham.
1861	Jones, Sir Wilmoughby, Bart. Cannon-hill, Falmouth, Kent 42.
1867	*Jordan, Wm. Loughton, Esq. 1, Porters-square, Notting-hill, W.
1867	Joshua, Moss, Esq. Melbourne; and 22, Clifton-gardens, Maida-hill, W.
1866	1060 Jourdain, Frederick John, Esq. 10, Austin-fruere, E.C.

Year of Election.	
1858	Kay, David, Esq. 17, Abingdon-terrace, Kensington, W.
1863	Kaye, J. W., Esq. India Office, S. W.
1866	*Kean, Charles, Esq. 80, George-street, Hanover-square, W.
1860	Kears, R. W., Esq., Lieutenant-Governor, Trinidad.
1857	Keating, Sir Henry Singer, Q.C., one of the Judges of the Court of Common Pleas, 11, Prince's-gardens, S. W.
1857	Keene, Rev. C. E. Ruck. Swyncombe-park, Henley-upon-Thames.
1863	Keir, Simon, Esq. Conservative Club, S. W.
1866	*Kellett, Rr.-Adm. Henry, C.B. Clonmel, Ireland.
1861	Kelly, William, Esq. Royal Thames Yacht Club, 7, Albemarle-street, W.
1860	1070*Kensball, Col. Arnold Burrows, C.B., Indian Army. H.M.'s Consul-General, Bagdad; and 6, Chester-place, Hyde-park, W.
1863	Kempster, J., Esq. 1, Portsmouth-place, Kennington-lane, Surrey, S.
1861	Kennard, Adam Steinmetz, Esq. 7, Fenchurch-street, E. C.
1859	Kennard, Coleridge J., Esq. 14, Lombard-street, E. C.; and 13, Prince's-terrace, Prince's-gate, S. W.
1861	Kennard, Robert William, Esq., M.P. 37, Porchester-terrace, Hyde-park, W.
1861	Kennedy, Edward Shirley, Esq. Esher, Surrey.
1854	Kennedy, Rev. John, M.A. 4, Stepney-green, E.
1866	Kerr, J. H., Esq., R.N. Hydrographic-office, S. W.
1867	Kerr, Robt. M., Esq., Judge of the Sheriff's Court, City.
1864	Kerr, Lord Schomberg. 15, Bruton-street, W.
1862	1080Kerhew, Wm., Esq. 16, St. Mary Axe, E. C.; and Suffolk-lodge, Brixton-road, S.
1859	Key, Admiral Astley Cooper, R.N., C.B. United Service Club, S. W.
1862	Key, J. Binney, Esq. Oriental Club, W.
1857	Keysell, Francis P., Esq. Syonmore-villa, 35, Carlton-hill, St. John's-wood, N. W.
1864	*Kiddle, W. W., Esq.
1864	Kimber, Dr. E. Murchison-house, Dulwich, S.
1846	King, Lieut.-Colonel Edward R., 36th Regt. Junior United Service Club, S. W.
1866	King, John, Esq. The Bushetts, Thames Ditton, Surrey.
1858	King, Rev. Samuel W., A.M. Saxlingham-rectory, Norwich.
1861	King, Major W. Ross, Unatt., F.R.S., Scot. Tertre, Kinellar, Aberdeenshire; and Army and Navy Club, S. W.
1867	1090*Kinnaird, Hon. Arthur F., M.P. 2, Pall-mall-east, S. W.
1867	Kinnaird, George William Fox, Lord, K.B. Rossie-priory, Inchture, N.B.; and 33, Grosvenor-street, W.
1860	Kinns, Samuel, Esq., PH. D., F.R.S. Highbury-new-park College, N.
1858	Kirk, John, Esq., M.D. 45, George-square, Edinburgh.
1863	Kirke, John, Esq., Barrister. C. Thorold, Esq., Welham, Relford, Notts.
1861	Kirkland, Sir John. 17, Whitehall-pl., S. W.; and Foot's-cray-pl., Kent, S.E.
1866	*Kitson, James, Jun., Esq. Hanover-square, Leeds.
1835	*Kjaer, Thomas Andreas, Esq. Hjørnet af Kongens Nytor og Gatheragaden No. 28, 3d Sahl, Copenhagen.

Year of Election.	
1867	Knight, Andrew Hailey, Esq. 76, Westbourne-terrace, Hyde-park, W.
1868	Knollys, Lieut.-General W. T., V-Pres. Council of Military Education. Easton-square, S.W.
1867	Knox, Alrx. A., Esq. 91, Victoria-street, Westminster, S.W.
1861	Stocknos, Thomas G., Esq. India. Care of Messrs. Smith, Elder, and Co., 45, Pall-mall, S.W.
1868	Kopch, Henry, Esq. Canton-house, Shanghai. Care of H. C. Batchelor, Esq., 155, Cannon-street, E.C.
1861	Kyd, Hayen, Esq., M.A.S. Wadebridge, Cornwall.
1859	Labrow, Lieut.-Colonel Valentine H., F.R.S., F.C.S. Mire-court-chambers, Temple, E.C.; and Club-chambers, S.W.
1849	*Lafan, Capt Robert Michael, R.F. Army and Navy Club S.W.; and Othom-lodge, Kent.
1859	Lamb, Lieut. Henry, L.N. H.M. India Store Department, Raffles-road, Lambeth, S.
1865	*Lambert, Alan, Esq. Heath-lodge, Putney-Parish, S.W.
1864	Lambert, Charles, Esq. 2, Queen-street-place, Upper Thames-street, E.C.
1867	Lambert, Wm. Binks, Esq., O.R. 91, Queen Anne-street, Curcendish-square, W.
1864	1110 Lauert, Capt. G. F. 20, Albemarle-street, W.
1861	Lamont, James, Esq., M.P. E 1, Albany, W.
1866	Lampeny, John, Esq. 16, Curden-square, N.W.
1865	Lamprey, Thomas, Esq. Wicker-lodge, The Grove, Hammer-smith, W.
1867	Lamprey, Jones, Esq., M.V. 67th Regt. Waterford, Ireland.
1861	Lampson, C. M., Esq. 66, Queen-street, Chiswick E.C.
1838	*Lance, John Henry, Esq., F.R.S. The Holmwood, Dorking.
1861	*Lang, Andrew, Esq. Dunmore, Hunter-river, New South Wales; and Dunmore, Teignmouth, Devon.
1859	*Lange, Daniel A., Esq. 21, Regent-street, W.
1867	Langlands, John, Esq. Highceer. Melbourne, Australia.
1865	1110 Langley, Edward, Esq. Wolf-hall, Eltham, Kent.
1843	*Larcom, Maj.-General Sir Thomas Ashew, K.C., K.C.B., F.R.S. Castle, Dublin.
1861	Lardner, Col. John. Under Service Club, S.W.
1859	Larnach, Donald, Esq. 21, Kensington-palace-gardens, W.
1854	Larrobe, Ch. J., Esq. Whitebourne-court, Worcester.
1867	*Larrie John W., Esq. 4, St George's-place, S.W., and Musicallion-house, Thamehill, Hampshire.
1813	*Law, Hon. H. Spencer, M.A. 1, Lowndes-st., S.W., and Ellington-ho., Farnham.
1810	Law, William J., Esq. 83 Upper Seymour-street, W.; 23, Lincoln's-in-fields, W.C.; and 5, Sussex-square, Finsbury.
1861	Lawrence, Edward, Esq. Beechmont, Aspineth, Liverpool.
1867	Lawson, Wm., Esq. 21, Waltham Green, Fulkham S.W.
1867	1137 *Lay, Hon. H. N., Esq., Commissioner of Foreign Customs in China.
1857	Lazard, Austin H., Esq., M.P., F.C.S. 136, Piccadilly, W.

Year of Election.	
1866	*Layard, Lieutenant Brownlow Villiers (3rd W. India Regt.). 38, <i>Upper Mount-street, Dublin</i> ; and <i>Lane's Hotel, 1, St. Alban's-place, S.W.</i>
1863	*Leaf, Chas. J., Esq. <i>Old-change, E.C.</i> ; and <i>The Rylands, Norwood, S.</i>
1861	*Learmonth, Dr. John. <i>Parkhall, near Linlithgow.</i>
1866	Lebour, G. A., Esq. 6, <i>Addison-crescent, Kensington, W.</i>
1853	*Le Breton, Francis, Esq. 21, <i>Sussex-place, Regent's-park, N.W.</i>
1865	Le Feuvre, W. H., Esq., C.R. 18, <i>Great George-street, S.W.</i>
1861	Leckie, Patrick C., Esq. 7, <i>Palace-road, Roupell-park, Streatham, S.</i>
1839	Lee, Thomas, Esq. <i>Royal Institution, Albemarle-street, W.</i>
1833	1140*Lefevre, Sir John George Shaw, M.A., D.C.L., F.R.S., Vice-Chancellor of the University of London. 8, <i>Spring-gardens, S.W.</i>
1853	Lefroy, General John Henry, R.A., F.R.S. <i>Royal Arsenal, Woolwich, S.E.</i>
1862	Leggatt, Clement Davidson, Esq. 43, <i>Inverness-terrace, W.</i>
1861	Legh, Wm. John, Esq. 37, <i>Lowndes-square, S.W.</i> ; and <i>Lyme-park, Cheshire.</i>
1861	*Lehmanna, Frederick, Esq. 139, <i>Westbourne-terrace, W.</i>
1845	Leigh, John Studdy, Esq., F.R.S. <i>Care of S. Herapath, Esq., 4, Angel-court, Throgmorton-street, E.C.</i>
1863	Le Mesurier, Henry P., Esq., C.R. <i>St. Martin's, Guernsey.</i>
1863	Le Mesurier, M.-Gen. A. P. 2, <i>Stanhope-terrace, Hyde-park, W.</i>
1856	Lemon, Sir Charles, Bart., F.R.S., &c. <i>Carclew, near Falmouth, Cornwall.</i>
1857	*Lenox, George Wm., Esq. 34, <i>Portland-place, W.</i> ; and <i>Pont-y-Fridd, Glamorganshire.</i>
1856	1150Leslie, the Hon. G. W. 4, <i>Harley-street, W.</i>
1859	Leslie, Walter D., Esq. <i>Arthur's Club, St. James's-street, S.W.</i>
1866	Lester, Dr. C. S., R.N. 8, <i>Chepstow-place, Baywater, W.</i>
1867	L'Estrange, Carleton, Esq. <i>Carlton Club, S.W.</i>
1840	*Letts, Thomas, Esq. 8, <i>Royal Exchange, E.C.</i>
1863	Leveaux, E. H., Esq. 25, <i>The Cedars, Putney, S.W.</i>
1837	Levenson, George B. C., Esq. 73, <i>Gloicester-terrace, Hyde-park, W.</i>
1862	Levick, Joseph, Esq. 8, <i>Great Winchester-street, Old Broad-street, E.C.</i>
1866	Levings-Swift, Richard, Esq. <i>Levings-lodge, Richmond, Surrey.</i>
1859	Levinsohn, Louis, Esq. 7, <i>Finchbury-square, E.C.</i>
1865	1160Lévy, William Hanks, Esq. <i>Institution of the Association for the Welfare of the Blind, 210, Oxford-street, W.</i>
1852	Leycester, Captain Edmund M., R.N. 5, <i>Carton-place, Westbourne-park-road, Baywater, W.</i>
1861	Leyland, Luke Swallow, Esq. <i>The Leylands, Hatfield, Doncaster.</i>
1859	Lichfield, Thomas George, Earl of. <i>Shugborough, Staffordshire.</i>
1856	Lilford, Thomas Lyttleton Powys, Lord. 10, <i>Grosvenor-place, W.</i>
1860	Lindsay, H. Hamilton, Esq.
1857	Lindsay, Major-General the Hon. J., Grenadier Guards, M.P. 20, <i>Portman-square, W.</i>
1867	*Lindsay, Col. Robert J. L., M.P., V.O. <i>Lockings-house, Wantage, Berks</i> ; and 2, <i>Carlton-gardens, S.W.</i>

List of Fellows of the

Year of Election	
1850	*Lindsay, Wm. S., Esq. <i>Manor-house, Napperton, Middlesex.</i>
1858	Lister, John, Esq.
1859	1170 Little, Archibald J., Esq. 34, Brook-street, Grosvenor-square W.
1857	*Lloyd, George A., Esq. 2, Royal Exchange-buildings, E.C.
1861	Lloyd, Sir Thomas Davis, Bart., M.P. United University Club S.W.; and <i>Recessydd, Llanarth.</i>
1864	Lloyd, W., Esq. <i>Moor-hall, near Sutton Coldfield.</i>
1867	Lloyd, Rev Wm. V., M.A. 1, Lamster-gate, W.
1864	Ludlyn, Capt. Richard. 20, Montagu-square, W.
1865	Loch, George, Esq. 12, Albemarle-street, W.
1853	Loch, Henry Hrougham, Esq. <i>Government-house, Isle of Wight.</i>
1864	Loch, John Charles, Esq. 12, Albemarle-street, W.; and <i>Hampton.</i>
1857	Loch, William Adam, Esq. 9, Great George-street, Westminster, S.W.
1864	1171 Lockart, John, Esq. 8, Addison-road, Kensington, W.
1858	Lockhart, William, Esq., F.R.S., <i>Park-villas, Grosvenor-park, Blackheath, S.E., and Canada.</i>
1860	Lockwood, James Alfred. <i>United Arts Club, Hanover-square, W.</i>
1856	*Logan, Sir William Edmund, F.R.S. Montreal, Canada.
1860	Londborough, Wm., Esq. Forester, Land. <i>Phoenix-hotel, 25, Berkeley-st., W.</i>
1861	Long, George, Esq., M.A. 2, Beaumont-street, Brighton.
1859	*Long, Henry L., Esq. <i>Travellers' Club, S.W.; and Hampton-hedge, Farnham, Surrey.</i>
1857	*Long, W. Puckton, Esq.
1858	Longley, Morrell D., Esq. 4, Ennismore-place, Hyde-park, S.W.
1860	*Longley, Major George, R.E. <i>Lambeth Palace.</i>
1847	1190 Longman, Thos., Esq. <i>Paternoster-row, E.C.; and 9, Essex-st., Hyde-park, W.</i>
1858	Longman, William, Esq. 36, Hyde-park-square, W.
1861	Lonsdale, Arthur Pemberton, Esq.
1860	Louise, William Robert, Esq. <i>Melbourne, Australia; care of Mr. Rathbone, 16, Rathbone-street-north, E.C.</i>
1863	Lovel, Capt. 3, Grosvenor-park-villas, Blackheath, S.E.
1853	Lovett, Philip Crosby, Esq. <i>Lucombe-ho., Lucombe, Loughton Enclave, Essex.</i>
1867	Low, Alex. Esq. 84, Westbourne-terrace, W.
1861	Low, Robert, Esq. 17, Woburn-square, W.C.
1863	Low, R. P., Esq. 55, Parliament-street, S.W.
1858	Lowden, Rev George Rennie <i>Brent-villa Hamlet, Middlesex.</i>
1859	1191 Lowe, Capt. W. Drury. <i>Myra, Bettws-y-Coed, Llanwrst, North Wales.</i>
1867	Lowndes, F. C., Esq. 84, Eaton-place, S.W.
1860	Lowry, Joseph Wilson, Esq. 45, Robert-street, Hampstead-road, N.W.
1860	Loyd, Col. W. K. <i>Union Club, S.W.</i>
1863	Luard, Wm Charles, Esq. <i>Llanelli-house, Cardiff; and Albemarle Club, S.W.</i>
1860	Luke, William, Esq., <i>Bengal Civil Service</i> 94, Inverness-terr., Hyde-park, W.
1860	Lumden, Rev. Robert Conyn, M.A. <i>Chorley, Manchester.</i>
1863	Lush, Robert, Esq., Q.C. <i>Balmoral-house, Avenue-road, Royal-hy-park, N.W.</i>

Year of Entry.	
1806	Lydell, J. H., Esq. 12, Southampton-buildings, Chancery-lane, W.C.
1830	*Lyell, Sir Charles, Bart., M.A., LL.D., F.R.S. 73, Harley-st., Cavendish-sq., W.
1837	1220 *Lynch, Capt. H. Bloss, I.N., C.B., F.R.A.S. Athenæum Club, S.W.
1861	*Lynch, Thomas Kerr, Esq. 31, Cleveland-square, Hyde-park, W.
1858	Lyna, Francis, Esq.
1861	*Macarthur, Major-Gen. Sir Edward, K.C.B. 27, Prince's-gardens, W.
1863	Macbraire, James, Esq. Broadmeadows, Berwick-on-Tweed.
1862	Macdonald, Chamberough C., Esq. 32, Belvoir-park, Hampstead, N.W.
1843	Macdonnell, Sir Richard Graves, C.B., late Governor of S. Australia.
1863	Macfarlan, George, Esq. Christ-church, Canterbury, New Zealand.
1865	Macfarlan, John G., Esq. Clyde-villa, Amerley-hill, Upper Norwood.
1865	Macfie, Rev. M. Mossley-road, Birmingham.
1861	1220 Mackintosh, Alexander Brodie, Esq. Oriental Club, W.; and Dumoon, Scotland.
1839	Macintosh, Lieut.-General Alex. Fisher, K.B.
1845	*Macintyre, Patrick, Esq., F.R.A., Off. Assoc. Inst. Act.
	Mackay, Rev. Alexander, A.M. Free Manse, Rhynie, Aberdeenshire.
	*Mackean, Thos. W. L., Esq. 24, Oxford-square, Hyde-park, W.
1862	Mackenzie, Colin J., Esq. Windham Club, S.W.
1845	Mackenzie, Right Hon. Holt, F.R.A.S. Athenæum Club, S.W.; and 28, Wimpole-street, W.
1861	Mackenzie, Sir James J. Randall, Bart. Travellers' Club, S.W.; and Seatwell, Rosneath, Munlochy, N.B.
1860	*Mackenzie, James T., Esq. 69, Lombard-street, E.C.
1863	Mackenzie, John H., Esq. Wallington, Carshalton, Surrey.
1864	1230 *Mackeson, Edward, Esq. 59, Lincoln's-inn-fields, W.C.
1830	Mackillop, James, Esq., F.R.A.S. 30, Grosvenor-square, W.
1862	Mackinly, D., Esq. Oriental Club, W.
1864	Mackinnon, C. D., Esq. Care of Messrs. J. Clinch and Sons, 31, Abchurch-lane, E.C.
1861	Mackinnon, Lachlan, Esq. Menabilly, Par-Cornwall; and Reform Club, S.W.
1855	*Mackinnon, Wm. Alex., Esq., M.P., F.R.S. 4, Hyde-park-place, W.
1865	*Mackinnon, W., Esq. 150, Hope-street, Glasgow.
1860	Mackirdy, Lt.-Col. Elliot, 69th Rgt. U.S. Club, S.W.; and Tonghoo, Burmah.
1860	Maclean, William Crighton, Esq., F.R.S., 5, Camperdown-ter., Great Yarmouth.
1859	MacLeay, George, Esq. 35, Hyde-park-gardens, W.
1867	1240 MacLoughlin, David, Esq., M.D., Member of Legion of Honour, &c. 36, Bruton-street, Berkeley-square, W.
1855	MacLure, Andrew, Esq. MacLure, Macdonald, and Macgregor, 37, Wallbrook, E.C.
1861	MacLure, John William, Esq. 2, Bond-street, Manchester.
	Macmillan, Alex., Esq. 18, Bedford-street, Covent-garden, W.C.
1865	Macmurdo, G. W., Esq. 7, New Broad-street, E.C.
1858	Macnab, John, Esq.
1861	Macpherson, William, Esq. 82, Lancaster-gate, W.
1845	*Macqueen, James, Esq., K.C. Tower and Sword of Portugal. 4, Alma-terrace, Hammersmith, W.

List of Fellows of the

Year of Election.	
1864	Macrae, Colin W., Esq. <i>Oriental Club, Hanover-square, W.</i>
1865	Macgregor, Malcolm, Esq. <i>Sydney, New South Wales.</i>
1867	1350 McArthur, Alex., Esq. <i>Rosegh-hall, Briston-rue, Braxton, S.</i>
1867	McArthur, William, Esq. <i>1 Quaker-house, Braxton-rue, S.</i>
1869	McIntosh, Capt. Sir Francis Leopold, R.S. <i>United Service Club, S.W.</i>
1861	* McConnell, W. R., Esq., Barrister-at-Law. <i>12, King's Bench-walk, E.C.; and Chancery, Bristol.</i>
1862	McCook, John, Esq., M.D. <i>Junior United Service Club, S.W.</i>
1855	* McCrene, Captain Sir Robert J. le M., R.N. <i>Chappelfield, Herts; and Athenæum Club, S.W.</i>
1865	McDonald, James, Esq. <i>Oriental Club, Hanover-square, W.</i>
1865	Mekuson, D. P. Esq. <i>24, Pembroke-square, Regent-st., W.</i>
1867	McKean, James, Esq. <i>30, Holland-park, Kensington, W.</i>
1865	Morison, James T., Controller of Military Finance, <i>Bangalore, Madras.</i>
1855	1250 McGregor, Duncan, Esq. <i>Board of Trade, S.W.; and Athenæum Club, S.W.</i>
1877	Modhro, Duncan, Esq. <i>Hyde-place, Glasgow.</i>
1866	* Mulver, W. G., Esq., Superintendent of Chincona Plantations, <i>Ootacamund, Madras.</i>
1858	McKerrell, Robert, Esq. <i>45, Inverness-terrace, W. and Mauritius</i>
1852	McLeod, Walter, Esq. <i>Head Master of the Royal Military Asylum, Chelsea, S.W.</i>
1860	McNair, Capt. John F. A., R.A.
1859	McNair, The Right Hon. Sir John, G.C.B. <i>Granton, near Edinburgh.</i>
1867	Macnamay, John, Esq., J.R., M.S.O.L., Chief Engineer and Inspector of Machinery, H.M. Tugs, and Surveyor to the Port, <i>Bombay. 15, Dorset-terrace, Clapham-road.</i>
1850	Macland Geo. Gamble, Esq. <i>Shotover-house, Whitley, Oxon.</i>
1845	* Major, Richard Henry, Esq., F.R.S. <i>British Museum, W.C.</i>
1858	1170 Mauby, John Walter, Esq. <i>15, Richmond-terrace, Seven-oaks-road, Holloway, N.</i>
1853	* Macky, Thomas, Esq. <i>2, Parkside, Seven-oaks-road, Holloway, N.</i>
1862	* Macdon, Capt. Edward Donald, R.E. <i>Chatham.</i>
1863	Macdon, Jas., Esq. <i>12, Prince's-gate, Knightsbridge, W.</i>
1843	* Macdon, W. E., Esq. <i>Buenos, Longholme, near Carlisle.</i>
1854	* Macdon, Charles, Esq. <i>Audit Office, W.C.; and Belmont, Hompsford, N.W.</i>
1836	* Manchester Rt. Rev. James Prince Lee, Bishop of, F.R.S., &c. <i>Athenæum Club, S.W.; and Seelye Hall, Manchester.</i>
1860	Mann, James A. Esq., M.R.S.S. <i>Acson-ton-painton, W.</i>
1908	Mann, Robert James, Esq., M.D. <i>12, Cecil-street, Strand, W.C.</i>
1868	Manners, Geo., Esq., F.R.S. <i>Levensham-road, Craydon.</i>
1856	1180 Manning, Frederick, Esq. <i>Dryon-lodge, Leamington; and 8, Dover-street, W.</i>
1864	* Mansel Commander A. L. H.M.S. 'Hydra;' care of the Hydrographic office, <i>Admiralty, S.W.</i>
1839	Mantell, Walter Biddock Durant, Esq. <i>Wellington, New Zealand. Care of E. Stanford, Esq.</i>
1860	Mantell, Prof. Alphonse, M.A. <i>27, St. Stephen's-square, Regent-st., W.</i>

Year of
Election.

- 1830 *Marjoribanks, Edward, Esq. 34, Wimpole-street, W.
- 1854 Markham, Clements Robert, Esq. *India Office, S.W.*; and 21, Eccleston-sq. S.W.
- 1857 Marlborough, George, Duke of. *Blenheim, Woodstock. Care of E. Stanford, Esq.*
- 1864 Marsden, Rev. Canon J. H. *Higher Broughton, Manchester.*
- 1857 Marsh, Matthew Henry, Esq., M.P. *Oxford and Cambridge Club, S.W.*; and 41, Rutland-gate, S.W.
- 1862 Marshall, Capt. J. G. Don. 48, Gloucester-square, Hyde-park, W.
- 1290 Marshall, Jas. Garth, Esq. *Headingley, nr. Leeds; and Monk Coniston, Ambleside.*
- 1862 Marshall, William, Esq. 4, Paper-buildings, Inner Temple, E.C.
- 1859 *Marsham, the Hon. Robert. *The Mote, Maidstone, Kent.*
- 1857 Marshman, J. C., Esq. 7, Kensington-palace-gardens, W.
- 1867 Marthin, Guillermo E. de, Con.-General United States of Columbia. 13, Beeborough-street, Pimlico, S.W.
- 1857 Martin, Francis P. B., Esq.
- 1861 Martin, Henry, Esq. *Sussex-house, Highbury-new-park, N.*
- 1860 *Martin, Richard Biddulph, Esq. *Clarewood, Buckley, S.E.*
- 1862 Martin, Thomas, Esq. 5, Compton-terrace, N.
- 1867 Martin, Wm., Esq. 37, Cleveland-square, Paddington, W.
- 1865 1300 Masarvon, Wm. R., Esq.
- 1845 *Matheson, Sir James, Bart., M.P., F.R.S. 13, Cleveland-row, S.W.; and *Achnay, Bonar-bridge, Sutherlandshire, &c.*
- 1858 Mathieson, James Ewing, Esq. 77, Lombard-street, E.C.; and 16, Queen's-gardens, Baywater, W.
- 1861 *Maxwell, Sir William Stirling, Bart., M.P. 128, Park-street, Grosvenor-square, W.
- 1855 May, Daniel John, Esq., R.N. *Cape of Good Hope. Care of Case and Loudensack.*
- 1861 Mayer, Joseph, Esq., F.R.S. 68, Lord-street, Liverpool.
- 1861 Mayers, William S. F., Esq., Interpreter to H.M. Consulate. *Shanghai. Care of F. J. Angier, Esq., 12, George-yard, Lombard-street, E.C.*
- 1867 Mayhew, Rev. Samuel Martin. 158, New Kent-road, S.
- 1862 Mayne, Captain Richard Charles, R.N. *H.M.S. 'Eclipse'; and 80, Chester-square, S.W.*
- 1858 Mayo, Capt. John Pole. *Army and Navy Club, S.W.*
- 1867 1310 Mayson, John S., Esq. (J. P. for county of Lancashire). *Oathill, Fallowfield, near Manchester.*
- 1863 Meade, the Hon. Robert Henry. *Foreign Office, S.W.*; and 3, Belgrave-sq. S.W.
- 1862 *Medlycott, Lieut. Mervyn B., R.N. *Care of Messrs. Woodhead.*
- 1861 *Meinertzhagen, Daniel, Esq. 10, Moorgate-street, E.C.; and 28, Devonshire-place, Portland-place, W.
- 1865 Meller, Charles James, Esq., M.D. 48, Queen Anne-street, Cavendish-square, W.
- 1854 Melvill, Col. Sir Peter Melvill, Mil. Sec. to the Bombay Gov. 27, Palmeira-square, Brighton.
- 1838 Melvill, Philip, Esq., F.R.S. *Eltham-house, Lostwithiel, Cornwall.*
- 1863 Mercier, Rev. J. J. *Hanwell, W.*

List of Fellows of the

Year of Election	
1845	*Merivale, Herman, Esq., C.B., Under Sec. of State for India, India Office, S.W. and 11, Grosvenor-terrace, W.
1846	Messiter, Charles A., Esq. Bockish, near Ford, Somerset
1847	*Meunier, Frederic Morichon Esq. Wanch, Cambridge-st.
1847	*Mozbrough, John Chas. Gen. Earl of. 3, Dover-street, W., and Methuyn-park near Leeds.
1848	*Miles, Lieut. Colonel J. E., R.A. Syon-park, Rochester.
1849	Michael, Thomas, Esq. St. Petersburg.
1849	*Miles, A., Esq. 26, Aston-row, E.C.
1848	Millerton, Lieut. Alfred Sir G.N. Broke, Bart., R.M.S. "Hercules" Steamers, and Brookwood, Surrey.
1853	Milnes, John, Esq. Grosvenor, Lymington-road, Wembley.
1848	Milne, Capt. Herbert St. John Fide Pringle. 19, Charles-street, Berkeley-square, W.
1856	Miles, John, George, Esq. 4, Stationers'-hall-court, Ludgate-hill, E.C., and 20, Devonshire-square, Portman-place, W.
1849	Miles, Rev. R. Bingley, Notts.
1861	133 *Miller, George T., Esq. 59, Portland-place, W.
1861	*Miller, Commodore Henry Matthew, R.N. The Grove, Esher; and Junior United Service Club, S.W.
1855	*Miller, apt. Thos., R.N. "H.M.S. "Royal George," and United Service Club, S.W.
1861	Miligan, Joseph, Esq. 15, Northumberland-street, W.C.
1857	Miles, Arthur, Esq. 34, Hyde-park-gardens, W.
1863	*Mills, John R., Esq., M.P. Kingswood-bridge, Twickenham, W.S.
1861	Miles, Rev. John. 40, Tottenham-square, E.
1853	*Milnes, Viscount, M.P. 4, Grosvenor-square, W.
1860	Milman, Capt. Francis, Madras Home Artillery. 9, Portman-square, W.
1856	Miles, Vice-Adml. Sir Alex., R.N. United Service Club, S.W.
1847	134 *Milner, Rev. John, M.A. Chaplain of H.M.S. "Isolator."
1860	Mitchell, Capt. Alexander, M.P. 6, Great Stanhope-street, Park-lane, W.
1862	*Mitchell, George, Esq. 21, Holten-street, Finsbury, W.
1864	Mitchell, J. W., Esq. Mansfield, Woodhouse, Notts.
1864	Mitchell, Thomas, Esq., C.B. Oldham.
1853	Mitchell, Sir William. 6, Hyde-park-gate, Kensington-gore, W.
1865	Mitchell, Wm. H., Esq. Junior United Club, S.W.
1861	*Mouton, Frederick D., Esq. 33, Gloucester-place, Portman-square, W.
1863	Maitell, George, Esq., M.P. 107, Eaton-square, S.W.
1861	Mason, Alexander Fullerton, Esq. 10, Lansdowne-terrace, Notting-hill, W.
1861	135 *Mory, Lieut. Col. George Henry. 9, Berkeley-street, W.
1842	*Montagu, Major Willoughby. Chesham-common, E.
1862	*Montagu, Capt. Horace. 24, Chapel-street, Park-lane, W.
1836	*Montague, Sir Moses, Bart., F.R.S., F.R.S.E. 1, Grosvenor-gate, Portman-square, W.; and Landschiff-terrace, Kensington.
1859	Montgomery, F. Walter, Esq. 2, Cleveland-row, St. James's, S.W., and St. Leonard's-terrace.

Year of Election.	
1859	Montgomerie, Capt. T. G., Engrs., 1st Assist. Trig. Survey. <i>Care of Messrs. Alexander Fletcher & Co., 10, King's-arms-yard, Moorgate-street, E.C.</i>
1860	Montgomery, Robert Mortimer, Esq. 18, <i>Ulster-place, Regent's-park, N.W.</i>
1865	Montgomery, Sir Robert, K.C.B. 7, <i>Cornwall-gardens, Queen's-gate, W.</i>
1839	Moody, General R. C., R.E. <i>Caynham-house, near Ludlow, Shropshire.</i>
1861	Moon, Rev. Edward Graham. <i>Fetcham, Surrey.</i>
1857	1360* Moor, Rev. Allen P., M.A., F.R.S.S. Sub-Warden St. Augustine College, <i>Canterbury.</i>
1863	Moore, H. Byron, Esq. <i>Survey Office, Melbourne, Australia. Care of Mr. Wadson, 100, St. Martin's-lane.</i>
1861	Moore, John Carrick, Esq. <i>Cornwall, Wiltshire; Geological Society, W.C.; and 28, Bolton-street, W.</i>
1857	Moore, Major-General W. Y. <i>United Service Club, S.W.</i>
1863	More, R. Jasper, Esq., M.P. <i>Linley-hall, Salop.</i>
1864	Morgan, D. L., Esq. <i>H.M.S. 'Euryalus.'</i>
1861	Morgan, Junius Spencer, Esq. 13, <i>Prince's-gate, Hyde-park, S.W.</i>
1861	Morgan, William, Esq., R.N. 1, <i>Sussex-place, Southsea, Hants.</i>
1866	Morland, Lieut. Henry, late I.N. <i>Assistant Dockmaster, &c., Bombay.</i>
1859	*Morris, Charles, Esq. <i>University Club, S.W.</i>
1859	1370* Morris, Herbert Henry, Esq., B.A. (late) Oxford; Bengal Civil Service. 6, <i>Clarence-parade, Southsea, Hants; and Middle-temple, E.C.</i>
1863	Morrison, Col. J. D. 7, <i>Albemarle-street, W.</i>
1867	Morrison, Pearson, Esq. 30, <i>Cornhill, E.C.</i>
1865	Morson, T., Esq. 124, <i>Southampton-row, Russell-square, W.C.</i>
1861	*Mouat, Frederick J., Esq., M.D., Surgeon-Major and Inspector-General of Prisons, Bengal Army, &c. <i>Athenaeum Club, S.W.; and 45, Arundel-gardens, Nottingham, W. Care of Messrs. A. G. Lepage & Co., 1, Whitefriars-st., Fleet-st., E.C.</i>
1858	Mudie, Charles Edward, Esq.
1858	Mueller, Ferdinand, Esq., M.D., PH. DR. <i>Director of the Botanical Gardens, Melbourne. Care of Messrs. Dulau and Co., 37, Soho-square, W.</i>
1862	Muir, Francis, Esq., LL.D.
1855	Muir, Thomas, Esq. 24, <i>Fork-terrace, Regent's-park, N.W.</i>
1867	*Muir, Thomas, Esq., Jun. <i>Madeira; and 24, Fork-terrace, Regent's-park, N.W.</i>
1859	1380 Mundella, A. J., Esq. <i>Nottingham.</i>
1866	*Murchison, John H., Esq. <i>Surbiton-hill, Kingston-on-Thames; and Junior Carlton Club, S.W.</i>
1859	Murchison, Kenneth R., Esq. <i>Manor-house, Bathford, Bath.</i>
1830	*Murchison, Sir Roderick Impey, Bt., K.C.B., G.C.ST.A., M.A., D.C.L., V.P.R.S., G.S., and L.S., Director-General of the Geological Survey of Great Britain and Ireland, Trust. Brit. Mus., Hon. Mem. R.S. of Ed., B.I.A., Mem. Acad. St. Petersburg, Berlin, Stockholm, Brussels, and Copenhagen, Corr. Ins. Fr., etc. etc. 16, <i>Belgrave-square, S.W.; and 28, Jermyn-street, S.W.</i>
1864	Murchison, Capt. R. M. <i>Bath.</i>
1830	*Murdoch, Thomas W. C., Esq. 8, <i>Park-street, Westminster, S.W.; and River-bank, Putney, S.W.</i>

- Year of Election.
- 1860 Murray, George J., Esq. *Hook-village, Hornsea, and Jun, Carlton Club, S.W.*
- 1864 *Murray, James, Esq. *Foreign Office, S.W.*
- 1865 Murray, John, Esq. *50, Abchurch-lane, W.; and Newstead, Wembley, S.W.*
- 1866 *Murray, Lt. W., 68th Reg. & 1st Top. Assnt. G. Ing. Survey. *Mussouri, India. Messrs. Danks, Eldon and Co.*
- 1866 : 390 Massey H. G. de, Esq., M.D. *4, Grosvenor-place, W.*
- 1865 Maize, F. A., Esq. *2, Great-hill, Camberwell, S.*
- 1866 Maize, Maj.-General, Geo. Thomas Coulls, G.D. *Jun, United Service Club, S.W.*
Care of Sir J. Kirkland.
- 1866 Maize, W. Esq. *St. Margaret's-house, Ipswich.*
- 1866 *Maize, Capt. David J., 1st Assnt. Trigonometrical Survey. *Bhoj, Bombay.*
5, Charlotte-street, Edinburgh.
- 1866 Maize, Sir Richard Dugby Bart. *Temple-hill Club, S.W.; 78, Leaden-street, S.W., and Deacons-parish, Rotherham, Essex.*
- 1866 *Maize, Henry, Esq. *6, The Terrace, South Hackney, N.E.*
- 1866 Maize, Lieut.-Col. Francis W. (Coldstream Guards). *Care of Col. E. Maize, Assistant Adjutant-General, Aldershot Camp.*
- 1866 Maize, Thomas Holdsworth, Esq. *41 Green-street, Grosvenor-square, W.*
- 1866 Nicol, James D., Esq., M.P. *13, Hylle-park-terrace, Camberland-gate, W.*
- 1866 : 400 *Nichols, Robert J., Esq. *5, Westbourne-park-place, W.*
- 1866 Nicholson, Sir Charles, Bart., D.C.L., Chancellor of the University, Sydney. *26, Leconfield-place, Portland-place, W.*
- 1866 Nicholson, Rear Admiral Sir Frederick Wm, Esq., Bart. *13, White-moor-street, Leaden-square.*
- 1866 Nissen, H. A., Esq. *Mark-lane, E.C.*
- 1866 Nix, John H., Esq. *77, Lombard-street, E.C.*
- 1866 Noel, the Hon. Rozen. *11, Cannon-street, Grosvenor-square, W.; and Carlton-hall, Daresbury, Lancashire.*
- 1866 *Nolich, Captain Matthew S., R.N. *Boag-King, United Service Club, S.W.*
and St. Mary's-cottage, Parkham, Surrey, S.E.
- 1866 Norman, H. J., Esq. *106, Finchchurch-street, E.C.*
- 1866 Norris, Harry, Esq. *Command Office, S.W.; and 4, Little St. James's-street, S.W.*
- 1866 North, Alfred, Esq. *30, Royal London-terrace, Clifton, Bristol.*
- 1866 : 420 North, Frederic, Esq. *3, Waterloo-street, Finsbury, S.W.; and Hastings-bridge, Hastings.*
- 1866 Northumberland, Algernon George, Duke of. *Northumberland-house, S.W.*
- 1866 Notman, Henry Wilson, Esq. *7, Great Marlborough-street, W.*
- 1866 Nourse, Henry, Esq. *Conservative Club, S.W.*
- 1866 *Oakley, R. Danner, Esq. *Overhill-hill, Yorkshire.*
- 1866 O'Brien, James, Esq. *100, Belgrave-road, Finsbury, S.W.; and Clare, Ireland.*
- 1866 O'Callaghan, Chas., Esq., Staff Surgeon. *Kilmarney, Ireland.*

Year of Election.	
1856	O'Connor, Major-General Luke Smyth, C.B., late Governor of the Gambia. <i>U.S. Club, S.W.</i>
1858	Ogilvie, Edward D., Esq. <i>Fulgillar, Clarence-river, New South Wales. Care of Messrs. Marryat and Sons, Laurence Pountney-lane, E.C.</i>
1858	Ogilvy, Col. Thos. 23, Grafton-st., Piccadilly, W.; and Ruthven, Forfarsh., N.B.
1858	1420 Ogilvy, Thos., Esq. 62, Princess-gate, Hyde-park, W.
1859	Ogle, John W., Esq., M.D. 13, Upper Brook-street, W.
1861	Oldershaw, Capt. Robert Piggott. 74, Warwick-square, Belgrave-road, S.W.
1855	Oliphant, Laurence, Esq., M.P. <i>Athenæum Club, S.W.</i>
1861	Oliphant-Ferguson, G. H., Esq. <i>Broadfield-house, Carlisle.</i>
1866	Oliver, Lieut. S. P., 12th Brigade R.A. 1, Buckingham-villas, Brockhurst-road, Gosport, Hants.
1866	*Ommanney, Adml. Erasmus, C.B., F.R.A.S. 6, Talbot-square, Hyde-park, W.; and <i>United Service Club, S.W.</i>
1838	*Ommanney, H. M., Esq. <i>Blackheath, S.E.</i>
1866	O'Reilly, E., Esq.
1858	Osborn, Sir George R., Bart. <i>Travellers' Club, S.W.; and Chicksand-priory, Beds.</i>
1864	1430 Osborn, Samuel, Esq., M.D. 19, Manor-terrace, Briston, S.
1856	Osborn, Capt. Sherard, R.N., C.B., Officier de Légion d'Honneur, etc. <i>Athenæum Club, S.W.; and 118, Gloucester-terrace, W.</i>
1861	Osborne, Lieut.-Col. Willoughby. <i>Political Agent, Bhopal, Schira, India.</i>
1858	Oswell, William Cotton, Esq.
1855	Otway, Arthur John, Esq., M.P. <i>Army and Navy Club, S.W.</i>
1860	*Ouvry-North, the Rev. J. <i>East Acton, Middlesex, W.</i>
1844	*Overstone, Samuel, Lord, M.A., M.B.I. 2, Carlton-gardens, S.W.; and <i>Wickham-park, Surrey.</i>
1867	Owen, Chas. Lanyon, Esq. (Lieut. and Adj. R. M. Light Inf., Portsmouth Division). <i>Glendowan-lodge, Bury-road, Gosport.</i>
1866	Owen, H. Burnard, Esq.
1846	*Oxford, Rt. Rev. Samuel Wilberforce, Bishop of, F.R.S., F.S.A. 26, Pall-mall, S.W.; <i>Cuddesden-palace, Wheatley, Oxfordshire; and Lavington, Sussex.</i>
1861	1440 Page, Thomas, Esq., C.B., F.G.S. 3, Adelphi-terrace, W.C.; and <i>Tower Cross, Aubrey-road, Baywater, W.</i>
1853	Pakington, Right Hon. Sir John Somers, Bart., M.P. 41, Eaton-square, S.W.; and <i>Westwood-park, Droitwich, Worcestershire.</i>
1855	Palmer, Major Edm., R.A. <i>Boxhill, Pennycross, Plymouth.</i>
1865	*Palmer, Commander George, R.N. <i>H.M.S. "Rosario," Australia; and Cavers, Hawick, Roxburghshire, N.B.</i>
1862	Palmer, Rev. Jordan, M.A., F.S.A., Chaplain to St. Ann's Royal Society. <i>Streatham, S.</i>
1838	*Palmer, Samuel, Esq.
1865	*Papengouth, Oswald C., Esq., C.E. 46, Russell-square, W.C.
1863	*Paris, H.R.H. Le Comte de. <i>Claremont.</i>
1864	Parish, Capt. A. <i>Chislehurst, Kent.</i>

Year of Election	
1849	*Parish Capt. John P., R.N., <i>Army and Navy Club S.W.</i> <i>Club of Messrs. St. John's.</i>
1853	1450*Parish Sir Woodhouse, K.C.H., F.R.S., &c. <i>Quarry-house, St. Leonard's-on-sea.</i>
1860	Parish, Capt. Francis G., S. <i>Salford District, Manchester.</i>
1861	Parson Henry T., Esq. 3, <i>Leicester-square, Newington, W.</i>
1862	Parker, Robert Paine, Esq. <i>Queen's Club, S.W.</i> and <i>Barham, Kent.</i>
1850	Parkes Sir Henry D., Bart., Esq. <i>Oriental Club, W.</i> , and <i>Athenaeum Club, S.W.</i>
1850	*Parkes, Mansfield, Esq., F.R.S. <i>Arthur's Club, St. James's-street, S.W.</i> and <i>Woolwich-house, Kent.</i>
1850	Parker, Mary Henry, Esq. 8, <i>Musling-lane, E.C.</i>
1867	Parson, John Esq. 18A <i>Edmond-street, City E.C.</i>
1857	Parson, Andrew A., Esq. 11 <i>B.M. & V. Consul, Musling-lane, E.C.</i>
1863	Pattinson, J., Esq. 21, <i>Bedford-street, E.C.</i>
1858	1460*Pattison, Joseph, Esq. <i>Commercial Union, India, Isle of Wight.</i>
1865	Payne, Captain J. Bertrand, R.N., F.R.S., &c. <i>Memorial Club, St. of France.</i> <i>Conservative Club, S.W.</i> <i>Payne's Chamber of Commerce Club, W.</i> and <i>Temple-house, The George, Hampton, W.</i>
1847	*Payne or Willms Esq., F.R.S., &c. 21, <i>Belgrave-square, S.W.</i> and <i>Camden-house, Richmond, Surrey, S.W.</i>
1856	Pembrey, George, Esq. 22, <i>Old Broad-street, E.C.</i>
1857	Pembrey, George, Esq. <i>St. James's, near Rector.</i>
1853	Pembrey, Capt. B. B., R.N. <i>Arthur's Club, St. James's-street, S.W.</i>
1863	Pembrey, Fred., Esq. 13, <i>Commercial-square, W.</i>
1863	*Pembrey, Alexander, Esq. <i>Woolwich.</i>
1860	*Peck, Henry William, Esq. <i>Woolwich-house, S.W.</i>
1864	Peck, Archibald, Esq. 36, <i>Portland place.</i>
1858	147*Peck, Sir Robert, Bart., M.P. 4, <i>Whitehall-gardens, S.W.</i> and <i>Longman, Tamworth.</i>
1850	*Penny, George John Douglas, Esq. <i>Leicester-square, E.C.</i>
1855	*Penny, Col. N. S. Douglas, <i>Leicester-square, E.C.</i>
1853	Perry, Major-General the Hon. Capt. Henry M. Cornhill. <i>Northumberland-street, E.C.</i>
1865	Perry, Edmund J., Esq. <i>Leicester-square, E.C.</i>
1865	Perry, Samuel, Esq., late Hon. L.C.S., Bombay, F.R.S., &c. <i>Leicester-square, E.C.</i> and <i>Leicester-house, Westbury, S.</i>
1860	Perrins, Frederick, Esq. <i>Major of Southampton.</i>
1865	Perrins, William, Esq. <i>Argentine Republic Club of W. Rector, E.C.</i>
1860	Perry, Sir Erasmus, Member Indian Council. <i>Leicester-square, S.W.</i>
1860	Perry, William, Esq., H.B.M.'s Consul, Panama. <i>Athenaeum Club, S.W.</i>
1862	148*Perry, William, Esq. 6, <i>Woolwich-road, Upper Clapton, S.E.</i>
1862	Peter, John, Esq.
1857	*Peterson, William, Esq. 35, <i>Northumberland-street, E.C.</i>
1860	Petherick, John, Esq. <i>Woolwich-house</i>
1858	Peto, Sir S. Merton, Bart., M.P. 12, <i>Northumberland-street, E.C.</i>
1861	Petrie, Alexander D., Esq. 4, <i>Northumberland-street, E.C.</i>
1860	Petrie, Captain Martin, 14th Regiment. <i>Northumberland-street, E.C.</i>

Year of Election	
1866	Pharazyn, Robert, Esq. <i>Wellington, New Zealand.</i>
1867	Phayre, Col. Sir Arthur. <i>East India United Service Club, S.W.</i>
1854	Phelps, William, Esq. 18, <i>Montagu-place, Russell-square, W.C.</i>
1862	1490Phéné, John Samuel, Esq. 34, <i>Oakley-street, Chelsea, S.W.</i>
1860	Philp, George, Esq. 32, <i>Fleet-street, E.C.</i>
1865	Phillips, Edward B., Esq. 105, <i>Onslow-square, S.W.</i>
1857	Phillimore, Capt. Augustus, R.N. 25, <i>Upper Berkeley-st., W.; and U.S. Club, S.W.</i>
1859	Phillimore, Chas. Bagot, Esq. <i>India Office, S.W.; and 25, Upper Berkeley-st., W.</i>
1861	Phillimore, Sir Robert. 5, <i>Arlington-street, S.W.</i>
1860	Phillimore, Wm. Brough, Esq., late Capt. Grenadier Guards. 5, <i>John-street, Berkeley-square, W.</i>
1830	*Phillippe, Sir Thomas, Bart., M.A., F.R.S., F.B.A. <i>Middle-hill, Broadway, Worcestershire.</i>
1854	Phillips, Major-General Sir B. Travell. <i>United Service Club, S.W.</i>
1856	Phillips, John, Esq., Solicitor. <i>Hastings.</i>
1864	1500*Pigou, F. A. P., Esq. <i>Dartford, Kent.</i>
1861	Pigou, Rev. F., M.A. 14, <i>Suffolk-street, Pall-mall East, S.W.</i>
1861	Pike, Frederick, Esq. 44, <i>Charing-cross, S.W.</i>
1852	*Pike, Commander John W., R.N. 26, <i>Old Burlington-street, W.; Junior United Service Club, S.W.</i>
1861	Pilkington, James, Esq. <i>Reform Club, S.W.; and Blackburn.</i>
1851	*Pim, Commander Bedford C. T., R.N. <i>Belsize-square, Hampstead, N.W.; and Senior and Junior United Service Club, S.W.</i>
1866	Pincott, James, Esq. <i>Telham-house-school, Drifton-hill, S.</i>
1859	Pinney, Colonel William. 30, <i>Berkeley-square, W.</i>
1867	Plant, Nathaniel, Esq. <i>Hotel Exchange, Rio de Janeiro; and De Montfort-house, Leicester.</i>
1865	Player, John, Esq. 36, <i>George-street, Edgbaston, Birmingham.</i>
1860	1510Playfair, Lieut.-Col. Robert Lambert. H.B.M. Consul-General, <i>Algiers. Care of E. Hertslet, Esq., Foreign-office.</i>
1866	Plowden, Charles, C., Esq. 15, <i>York-street, Portman-square, W.</i>
1856	*Plowes, John Henry, Esq. 39, <i>York-terrace, Regent's-park, N.W.</i>
1855	*Pollexfen, Capt. J. J. <i>India.</i>
1866	*Pollington, Jno. Horace, Viscount. 33, <i>Dover-street, W.</i>
1853	Pollock, General Sir George, G.C.B. <i>Clapham-common, Surrey, S.</i>
1835	*Ponsonby, Hon. Frederick G. B. 3, <i>Mount-street, Grosvenor-square, W.</i>
1867	Pook, Captain John. 6, <i>Colfe's-villas, Leicisham-hill, S.E.</i>
1857	Pope, Captain Wm. Agnew. 52, <i>Charles-street, Berkeley-square, W.</i>
1863	*Porcher, Commander Edwin A., R.N. 50, <i>Montagu-square, W.</i>
1853	1520Porter, Edwd., Esq. <i>Athenaeum Club, S.W.; and 28, Suffolk-street, Pall-mall, S.W.</i>
1864	Portugal, Cher. Joaquim da. 11, <i>South-terrace, Grosvenor-park, Camberwell, S.</i>
1867	Potter, Wm. Henry, Esq. <i>Drusden-lodge, Sonning, near Reading.</i>

Year of Election.	
1861	*Founder, Captain Lonsdale. <i>Junior United Service Club, S.W.; and Brownland, Co. Wexford.</i>
1862	Povah, Rev. John V., M.A. 11, <i>Endelough-street, W.C.</i>
1863	*Powel, W. M., Esq., M.P. 1, <i>Cambridge-square, Hyde-park, W.</i>
1859	Power, E. Radnor, Esq. 5, <i>Quadrant, at Leonard's, Exeter, Devon.</i>
1854	Power, John, Esq. 3, <i>College-terrace, Cambridge-road, Hammersmith, W.</i>
1854	Power, John Arthur, Esq., M.A., D.M. 52, <i>Barlton-crescent, W.C.</i>
1864	Powys, Hon. C. J. F.
1864	1530 Powys, the Hon. L. R.
1864	Powys, Hon. Leopold. 17, <i>Montagu-street, Portman-square, W.</i>
1852	Price, James Glennie, Esq., <i>Barrister-at-law.</i> 14, <i>Clement's-ann, W.C.</i>
1860	*Prickett, Rev. Thomas Wilborn, M.A., M.A. 15, <i>Corwall-gardens, Queen's-pale, W.</i>
1865	*Pringle, A. Esq. <i>Tenr, Fother, N.B.</i>
1855	*Pringle, Thomas Young, Esq. <i>Reform Club, S.W.</i>
1860	*Prinsep, Edw. Aug., Esq., D.C.L., <i>Commissioner of Settlements in the Punjab. Under-sec. Care of Messrs Smith, Elder, and Co., 65, Abchurch-lane, E.C.</i>
1845	Prinsep, Henry T., Esq. <i>Little Holland-house, Kensington, W.</i>
1861	*Pridgers, Rev. Edwin <i>The Rectory, Aycliff St. Peter's, Leeds.</i>
1852	Prout, John William, Esq., M.A., <i>Barrister-at-law.</i> <i>Athenæum Club, S.W. and Newden, Midlton, N.W.</i>
1862	1540*Pugot, Major J. 8th Hussars, <i>Aldershot.</i>
1860	Puller, Arthur Giles, Esq. <i>Athenæum Club, S.W.; Arthur's Club, S.W., and Fennyburgh, Ware.</i>
1857	Purcell, Edward, Esq., M.D. 2, <i>Mass-hill, Greenwich, S.E.</i>
1867	Quin, Francis Beaufort Wyndham, Esq. <i>Wintanwick-house, near Market Drayton, Salop.</i>
1861	Quin, Lord George. 15, <i>Belgrave-square, S.W.</i>
1862	Quin, John Thos., Esq. <i>Care of Mr. Lamborn, Epsom.</i>
1854	*Quin, Alward Michael. <i>Senior United Service Club, S.W.; and 18, Albion-villa, Albion-road, Islington, N.</i>
1858	*Radstock, Gertrude Augustus, Lord. 30, <i>Eryonston-square, W.</i>
1862	*Rae, James, Esq. 32, <i>Thillmore-gardens, Kensington, W.</i>
1853	Rae, John, Esq., M.D. <i>Burkane-house Kirkcubright, Ayrshire; and 4, Finchwell-street, E.C.</i>
1867	1550Rae, Rev. A., D.D. <i>Arran-house, Highbury-new-park.</i>
1866	Ramsay, Alex., Jun., Esq. 45, <i>Norland-square, Notting-hill, W.</i>
1857	Ramsay, John, Esq. <i>Leam, N.B.</i>
1853	*Ramsay, Rear-Admiral Wm., C.B., F.R.S.A. <i>Junior United Service Club, S.W., and 23, Armatie-place, Edinburgh.</i>
1867	*Rinconen, Richard, Esq., M.A. <i>Camp-hill, Nunton, Warwickshire.</i>

Year of
Death.

- 1866 Ransom, Edwin, Esq. *Kempstone, near Bedford.*
1864 Ranyard, A. C., Esq. 13, *Hunter-street, W.C.*
1862 Rasch, F., Esq. 30, *Cambridge-square, Hyde-park, W.*
1859 Ratcliff, Charles, Esq., F.R.S. *National Club, S.W.; Edgbaston, Birmingham; and Downing College, Cambridge.*
1811 Rata, Lachlan Macintosh, Esq. 9, *South Audley-street, W.*
1846 1560 Ravenshaw, E. C., Esq., M.R.A.S. *Oriental Club, W.; and 36, Eaton-sq., W.*
1859 Ravenstein, Ernest G., Esq. *Typographical Depot, Spring-gardens, S.W.*
1865 Rawlings, Thos., Esq. *Hampton-villa, Pembroke-place, Bayswater, W.*
1861 Rawlinson, Sir Christopher. *United University Club, S.W.*
1844 *Rawlinson, Maj.-General Sir Henry C., M.P., K.C.B., D.C.L., F.R.S. *Athenaeum Club, S.W.; and 1, Hill-street, Berkeley-square, W.*
1836 Rawson, His Excellency Rawson Wm., C.B., Colonial Secretary. *Bahamas.*
1846 Ray, W. H., Esq. *Thorn-house, Ealing.*
1863 Reade, W. Winwoode, Esq. *Conservative Club.*
1865 Redhead, R. Milne, Esq. *Springfield, Seedley, Manchester; Conservative Club, S.W.; and Junior Carlton Club, S.W.*
1811 *Reid, David, Esq. 95, *Piccadilly, W.*
1858 1570 Reem, L. E. R., Esq. 43, *Lime-street, E.C.*
1859 Reers, John, Esq. *Conservative Club, S.W.*
1866 *Rehden, George, Esq. 3, *Great Tower-street, E.C.*
1856 Reid, Henry Stewart, Esq. *Bengal Civil Service. Messrs. Smith, Elder and Co.*
1857 Reid, Lestock R., Esq. *Athenaeum Club, S.W.; and 122, Westbourne-ter., W.*
1811 Reid, William, Esq., C.E. 27, *Chaloot-villas, Haverstock-hill, N.W.*
1861 Reilly, Anthony Adams, Esq. *Belmont, Mullingar.*
1830 *Rennie, Sir John, C.E., F.R.S., F.R.A. *Care of — Rennie, Esq., Miter-court-chambers, Temple, W.C.*
1866 *Rennie, John Keith, Esq., M.A. *Camb. 56, Gloucester-terrace, Hyde-park, W.*
1834 *Rennie, M. B., Esq., C.E. 22, *Portman-street, Portman-square, W.*
1864 1580 Rennie, W., Esq. 14, *Hyde-park-square, W.*
1830 *Renwick, Lieutenant, R.E.
1861 Reuter, Julius, Esq. 1, *Royal Exchange-buildings, E.C.*
1858 Reynardson, Henry Birch, Esq. *Adwell, near Tetworth, Oxfordshire.*
1867 Rhodes, Arthur John, Esq. 1, *Monmouth-road, Westbourne-groce, Bayswater, W.*
1857 Richards, Capt. George H., R.N. *Hydrographer to the Admiralty, S.W.*
1860 Richards, the Rev. George, D.D.
1864 Richardson, F., Esq. *Park-lodge, Blackheath-park.*
1859 Richards, Edward Henry, Esq. 4, *Connaught-place, Hyde-park, W.*
1862 Riddell, Henry P. A. Buchanan, Esq. *The Palace, Maidstone, Kent.*
1811 1590 *Rideout, W. J., Esq. 12, *Wellington-street, Strand, W.C.*
1811 Ridley, F. H., Esq. 19, *Blomfield-road, Maida-hill, W.*
1864 Ridley, George, Esq. 2, *Charles-street, Berkeley-square, W.*

Year of Election.	
1842	*Ragbe, Major-General Christopher Palmer, C.B., H.M.B. Comd., <i>Zurich</i> ; and <i>Overland Club</i> , W.
1843	Ragby, Joseph D., Esq. <i>Fisher, Surrey</i> ; and <i>Kew-green, Surrey</i> , W.
1844	Ratton, Robert, Esq. <i>Windham Club</i> , S.W.
1844	Ratton, John, Esq. 22, <i>Plumington-road, Lee, Kent</i> .
1845	*Rabe, Major-General Fred. H. 2, C.B. C. S. Club, S.W.; and 3, <i>Peace-garden-terrace, Kensington</i> , W.
1846	Roberts, Arthur, Esq. <i>Roundstone A. Old Kent-road, S.E.</i>
1846	Roberts, Capt. E. Wynne. <i>Junior Carlton Club, S.W.</i> ; and 18, <i>Great Cumberland street, Hyde-park</i> , W.
1846	Robertson, R. W., Esq., F.R.S. <i>Bristol, Harport, Cornwall</i>
1847	Robertson, A. Stuart, Esq., M.B. <i>Hockley, near Bolton</i> .
1847	Robertson, D. Bracke, Esq., H.M.'s Capt. <i>Canterbury, Smith, Elder and Co.</i>
1847	*Robertson, Graham Moore, Esq. 24, <i>Cleveland-square, Hyde-park</i> , W.
1847	Robertson, R. B., Esq. <i>H.M.'s Legation, Yokohama, Japan</i> .
1848	Robins, Thomas Valentine, Esq. <i>Silvery-cottage, Halebank, Dalton, Liverpool</i> .
1848	Robinson, Albert, Esq., C.R. <i>Kewhampton</i> .
1848	*Robinson, Rear-Admiral Charles G. 12, <i>Warwick-road, Maida-hill</i> , W.
1849	Robinson, Lieut.-Col. D. G., R.E., Director-Gen. of Telegraphs 11 <i>India Office</i> .
1849	Robinson Gen. M., Esq. 3, <i>Paragon, Southwark, S.</i>
1849	1610 Robinson, H. O., Esq. 12, <i>Loaden-hill-street, E.C.</i>
1849	Robinson, Sir Hercules G. R. <i>Governor of Ceylon, Messrs. Barnett</i> , 17, <i>Surrey-street</i> .
1849	Robinson J. R., Esq., F.R.S. Scot., F.R.S.A. <i>du Nord, Copenhagen, D.N.S. East</i> , <i>Mission des Antiquaires de Paris, de. South-terrace, Denmark</i> .
1849	Robinson Mr. Sergeant R. <i>Kang's-benah-bah, Temple, E.C.</i> ; and 43, <i>Wooden-burg square, W.C.</i>
1849	Robinson Lieut.-Col. Sir John Stephen, Bart. <i>Pokeby-hall, Dunleer, Ireland</i> . <i>Arthur's Club, S.W.</i> ; and 16A, <i>Park-lane</i> , W.
1849	Robinson John, Esq. <i>Care of Grosvenor Street, Esq.</i> , 90, <i>Corahill, F.C.</i>
1849	Robinson, Thos. Fleming, Esq., F.R.S. 9, <i>Lowest-terrace, South Fringe-park, Ankerley</i> .
1849	*Robinson, Walter F., Esq., Colman's R.E. 13, <i>Edwards-street, Portman-square, W.</i>
1849	*Rodd, James Russell, Esq.
1849	Roe, Capt. Jas. Septimus. <i>Surveyor-General, W. Australia. Messrs. Silwell, Armistead-street, Strand, W.C.</i>
1849	1610 Rogers, John T., Esq. 18, <i>Exhibition-square S.W.</i>
1849	*Rogge, Peter M., Esq., M.D., F.R.S. 18, <i>Hyper-Hatford-place, Russell-sq.</i> , W.C.
1849	Rohs, Lord, 18, <i>Upper Hyde-park-gardens, W.</i> ; and <i>Dunelm-street, Moffat, N.B.</i>
1849	Ross, M. Hermann von. 21, <i>Kensington-park-gardens, W.</i>
1849	Roske, Capt. W., R.E. <i>Forrest, Lymington, Hants</i> .
1849	*Rose, the Right Hon. Sir George, F.R.S., M.P. 4, <i>Hyde-park-gardens, W.</i> ; and 25, <i>Southampton-buildings, Chancery-lane, W.C.</i>

Year of Election	
1861	Ross, Jas. Anderson, Esq. Wandsworth, Surrey, S.W.; and 11, Salisbury-street, W.C.
1857	*Ross, Wm. A., Esq., Alderman. 63, Upper Thames-street, E.C.; and Befons, Crawford.
1864	Ross, B. R., Esq. Care of the Hudson-bay Company, Hudson-bay-house, Fen-church-street, E.C.
	Ross, Wm. Andrew, Esq. 7, Albemarle-street, W.
1867	1630 Rossiter, Wm., Esq. South London Working Men's College, Collingwood-street, S.
1854	*Roundell, C. S., Esq. 44, Piccadilly, W.
1862	Roupell, Robert Priolo, Esq., M.A., Q.C. 15, Albany, W.
1839	*Rous, Vice-Admiral the Hon. Henry John. 13, Berkeley-square, W.
1864	Routh, E. J., Esq. St. Peter's College, Cambridge.
1862	Bowe, Sir Joshua, C.B., late Chief Justice of Jamaica. 10, Queen Anne-street, Cavendish-square, W.
1863	Rowley, Commr. C., R.N. 48, Onslow-square, Brompton, S.W.
1856	Rucker, J. Anthony, Esq. Blackheath, S.E.
1861	*Rumbold, Charles James Augustus, Esq. Downing College, Cambridge; and 5, Percival-terrace, Brighton.
1861	Rumbold, Thomas Henry, Esq.
1860	1640 Rumley, Major-General Randall, Vice-President Council of Military Education. 12, Cadogan-place, S.W.
1858	*Russell, Arthur John Edward, Esq., M.P. 2, Audley-square, W.
1830	*Russell, Jesse Watts, Esq., D.C.L., F.R.S.
1830	Russell, John, Esq., F.R.S. 37, Chesham-place, S.W.; Pembroke-lodge, Richmond, S.W.; Endsleigh-ho., Devon; and Gart-ho., near Callendar, N.B.
	Russell, Wm. Howard, Esq., LL.D.
	Rutherford, John, Esq. 2, Cavendish-place, Cavendish-square, W.
1857	*Ryder, Admiral, Alfred P. U.S. Club, S.W.; and Laurels-abbey, Uppingham.
	Ryder, G., Esq. 10, King's Bench-walk, Temple, E.C.
1852	Sabine, Major-General Edw., R.A., Pres. R.S., F.R.A.S., &c. &c. 13, Ashley-place, Victoria-street, Westminster, S.W.; and Woolwich, S.E.
1847	St. Asaph, Rt. Rev. Thos. Vowler Short, Bishop of. Palace, St. Asaph, N. Wales.
1857	1650 St. David's, Connop Thurlwall, Bishop of. Abergwilly-palace, Carmarthen.
1863	St. George, Maj.-Gen. J. 17, Rutland-gate, S.W.
1863	St. John R. H. St. Andrew, Esq., 60th Rifles.
1862	St. John, Spencer, Esq., Chargé d'Affaires, Port-au-Prince, Haiti. 25, Grove-end-road, St. John's-wood, N.W.
1863	Sale, Lieut. M. T., R.E. The Crescent, Rugby; and Cherrapunjee, Bengal.
1867	Salkeld, Colonel J. C. (H.M.I. Forces). 29, St. James's-street, S.W.
1845	*Salomons, David, Esq., M.P., Alderman, F.R.A.S. 26, Great Cumberland-place, Hyde-park, W.; and Broom-hill, near Tunbridge-wells.
1863	*Salt, Henry, Esq. 29, Gordon-square, W.C.
1861	Salting, William Severin, Esq. 24, St. James's-street, S.W.

Year of Election	
1861	*Sandbach, Wm Robertson, Esq. 13, <i>Princes-gate, Hyde-park, N.W.</i>
1862	1660 Sandeman, David George, Esq., <i>Chimbridge-house, Piccadilly, W.</i> ; and 2 <i>Albion-street, Hyde-park, W.</i>
1862	Sanford, Major Henry Ayshford. 20, <i>Chester-street, Grosvenor-place, W.</i> ; and <i>Nynchod-court, Wellington, Somerset.</i>
1863	Santos, Le Chev. G. des. 12, <i>Exmouth-place, Portman-square, W.</i>
1864	Savel, Lieut.-Colonel H. A., 17th Lancers. <i>Army and Navy Club, S.W.</i> , and <i>Shanghai.</i>
1862	Sargood, F. J., Esq. <i>Moorgate-street-buildings, E.C.</i>
1860	Sartoris, Alfred, Esq.
1862	Saunders, Captain Thomas, R.N. <i>The Pire, Jersey.</i>
1866	Saunders, James E., Esq. 9, <i>Pinxteny-arcus, and Gravello-ph., Dischana, S.E.</i>
1864	Saurin, Admiral E. <i>Princes-gate, S.W.</i>
1863	Sawyer, Col. Charles, 6th Dragoon Guards. 30, <i>Summer-square, Kensington, Brighton.</i>
1863	1670 Sayer, Captain Frederick. <i>Gibraltar; and Manor-house, Rushmore, S.</i>
1866	Scarlett, Lieut.-General the Hon. Sir J. Yorke, K.C.M. <i>Portsmouth.</i>
1861	Schenck, Edward W. H., Esq. 14, <i>Princes-gate, S.W.</i>
1864	Scott, Adam, Esq. 3, <i>Bunfield-terrace, Westbourne-terrace, W.</i>
1860	Scott, Lord Henry, M.P. 3, <i>Tilney-street, Park-lane, W.</i>
1861	*Scott, Hercules, Esq. <i>Brotherton, near Montrose, N.B.</i>
1860	Scott, Admiral Sir James, K.C.B. <i>United Service Club, S.W.</i>
1866	Scott, John, Esq., M.D.
1863	Scovell, George, Esq. 34, <i>Grosvenor-place, S.W.</i>
1861	Searight, James, Esq. 80, <i>Lincoln-gate, W.</i>
1867	1680 Seaton, Col. the Right Hon. Lord. 15, <i>Albany, W.</i>
1860	*Sedgwick, the Rev. A., Woodwardian Lecturer, M.A., F.R.S. <i>Athenæum Club, S.W.</i> ; and <i>Cambridge.</i>
1862	Seernan, Berthold, Esq., F.R.S., F.R.S. 67, <i>Windor-road, Holloway, N.</i>
1866	Sedall, Walter T., Esq., Inspector of Schools in Ceylon. <i>Colombo, Civil Service Club, S.W.</i>
1865	Sernombe, Edwin, Esq. 49, <i>Brook-street, Grosvenor-square, W.</i>
1868	*Sescolli, Charles P., Esq. <i>Beverly, Luparpond-street, E.C.</i>
1863	Sewin, Charles, Esq. 155, <i>Fenchurch-street, E.C.</i>
1863	Sewell, Henry, Esq. 15, <i>Cothall-court, Throgmorton-street, E.C.</i> , and <i>Stamford-adj. N.</i>
1867	Seymour, Alfred, Esq., M.P. 47, <i>Eaton-square, S.W.</i>
1866	Seymour, George, Esq. 12, <i>Summer-square, Hyde-park, W.</i>
1860	1690 Seymour, Admiral Sir Geo. E., K.C.B., G.C.B. 115, <i>Eaton-square, S.W.</i>
1868	*Seymour, Henry Danby, Esq., M.P. 30, <i>Upper Grosvenor-street, W.</i> ; <i>Kensington, Wilt.</i> ; and <i>Gloucestershire.</i>
1864	*Shadwell, Captain Charles E., A.R.S., C.B. <i>Royal Naval Hospital, Haslar, Gosport.</i>
1860	*Shadwell, Lieut.-Colonel Lawrence.

Year of
Death.

- 1856 *Share, James Masters, Esq., R.N. *H.M.S. 'St. George,' Portland, Dorsetshire.*
- 1866 Sharp, Henry T., Esq. 102, Piccadilly, W.
- 1861 Sharp, Peter, Esq. *Oakfield, Ealing, W.*
- 1861 *Sharpe, William John, Esq. 1, Victoria-street, Westminster, S.W.; and *Norwood, Surrey, S.*
- 1862 *Shaw, John, Esq. *Finegond, Otago, New Zealand.*
- 1861 Shaw, John Ralph, Esq. *Arrowood-park, Birkenhead.*
- 1858 1700Shaw, John, Esq., M.D., Surgeon R.N. 84, Blackfriars-road, S.
- 1846 Sheffield, George A. F. C., Esq. of, 20, Portland-pl., W.; and *Sheffield-pk., Sussex.*
- 1861 Shell, Major-Gen. Sir Justin, K.C.B. 13, Eaton-place, Belgrave-square, S.W.
- 1861 Shephard, Chas. Douglas, Esq., Surg. R.N. *H.M.S. 'Frederick William,' Foynes, County Limerick.*
- 1867 Shephard, Chas. Wm., Esq., M.A., F.R.S. *Trotterscliffe, Maidstone.*
- 1861 Shepherd, Rev. Edw. John, M.A. *Trotterscliffe, Kent; and Athenaeum Club, S.W.*
- 1867 Sharer, General Sir George Moyle. 31, Inverness-road, Hyde-Park, W.
- 1860 Sheridan, H. Brinsley, Esq., M.P. *Bellefield-house, Parson's-green, Fulham, S.W.*
- 1863 Sheridan, Richd. B., Esq., M.P. 48, Grosvenor-place, S.W.
- 1857 Sherrin, Joseph Samuel, Esq., LL.D., PH. DR. *Layton-house, Layton-crescent, Kentish-town, N.W.*
- 1859 1710*Sherwill, Lt.-Col. W.S., F.R.S. *Prof. of Surveying, Civil Engr. College, Calcutta; and Perth, N.B.*
- 1856 *Shipley, Conway M., Esq. *Teyford Moors, Winchester; and Army and Navy Club, S.W.*
- 1866 Sholl, Charles, Esq., C.E.
- 1862 Showers, Lieut.-Col. Charles S.
- 1866 Shuttleworth, Sir J. P. Kay, Bart. 38, Gloucester-square, W.; and *Gawthorpe-hall, Burnley, Lancashire.*
- 1865 *Silva, Frederic, Esq. 12, Cleveland-square, Baywater, W.
- 1859 Silver, the Rev. Fred., M.A., F.R.S. *Norton-rectory, Market Drayton, Salop.*
- 1859 *Silver, Stephen Wm., Esq. 66, Cornhill, E.C.; and *Norwood-lodge, Lower Norwood, S.*
- 1860 Sim, John Coyagaze, Esq. 13, James-street, Buckingham-gate, S.W.
- 1853 Simmons, Edward R., Esq., Barrister-at-Law. 4, Hyde-park-gate, S.W.
- 1848 1720*Simmons, Colonel John L. A., R.E., C.B. *H. B. M.'s Consul, Warsaw; United Service Club, S.W.*
- 1866 Simons, Henry M., Esq. *Tyersall-crescent, Wood-road, Sydenham-hill, S.E.*
- 1853 Simpkinson, Lieut. Francis G., R.N. 55, Victoria-street, Westminster, S.W.
- 1864 Simpson, Frank, Esq. 17, Whitehall-place.
- 1862 Simpson, Henry Bridgeman, Esq. 44, Upper Grosvenor-street, W.
- 1861 Simpson, James, Esq., C.E., F.R.S. 29, Great George-street, Westminster, S.W.
- 1863 *Simpson, Wm., Esq. 64, Lincoln's-inn-fields, W.C.
- 1866 *Sims, Richard Proctor, Esq., C.E. *Malabar-hill, Bombay. Care of Messrs. Smith, Elder, and Co.*
- 1858 Stammersdale, Edward, Lord. *Lathom-park, Ormskirk, Lancashire.*

Year of Election.	
1806	Skinner, John E. H., Esq. 3, Dr. Johnson's-buildings, Temple, E.C.
1806	1730 Skinsbrook, Baron A., Lieutenant of the Austrian Navy. Marine Academy, Fiume, Austria. Care of F. Engelhardt, Esq., 0, Bolster-square, E.C.
1803	Skrine, Hy. D., Esq. Warleyhammar, near Bath.
1801	Sladen, Rev. Edward Henry Mainwaring. Allen, near Marlborough, Wils.
1801	Sligo, G. J. Browne, Marquis of. 14, Mansfield-street, W.; and Westport, County Mayo.
1805	Smedley, Joseph V., Esq., M.A. Oxford and Cambridge Club, S.W.
1800	*Smith, Augustus Henry, Esq. Norfolk-house, Gainsford.
1857	*Smith-Boscquet, Horace, Esq. Broxbourne-borough, Hertsdon.
1868	Smith, Drummond, Esq. 7, Mount-street, Berkeley-square, W.
1859	Smith, Edward, Esq. Windham Club, S.W.
1807	Smith, Frederick, Esq. The Priory, Dudley.
1853	1740 Smith, George, Esq. Gtinton, near Market Deeping, Lincolnsh.
1857	Smith, George R., Esq. 73, Eaton-square, S.W.; and Toleston-park, Surrey.
1803	Smith, Gifford, Esq. 63, Charing-cross, S.W.
1801	Smith, Jerome, Esq. 47, Belgrave-square, S.W.
1856	Smith, John, Esq., Mumb. Geograph. Soc. Bombay. 27, Prince's-pale, S.W.
1863	Smith, John Harrison, Esq. 49, Ince-terrace, W.
1853	Smith, John Henry, Esq. 1, Lambert-st., E.C.; and Purley, Croydon, Surrey.
1861	Smith, J. Sidney, Esq., Barrister-at-Law, Sidney-sage Windleton-common, S.W.
1861	*Smith, Joseph Travers, Esq. 25, Throgmorton-street, E.C.
1838	*Smith, Octavius Henry, Esq. Thame-street, Westminster, S.W.
1857	1750 Smith, Captain Philip, Grenadier Guards.
1841	*Smith, Thomas, Esq.
1859	*Smith, W. Carter, Esq. 1, Gloucester-terrace, Regent's-park, N.W.
1857	Smith, Wm. Gregory, Esq. Hudson-bay Company, Duchurch-street, E.C.
1859	Smith, William Henry, Esq. 1, Hyde-park-street, W.
1837	*Smith, Rear-Adm. William. Care of Messrs. Child and Co., Temple-bar.
1850	*Smith, Colonel William J., R.A.
1863	Snowden, Francis, Esq., M.A. 1, Dr. Johnson's-buildings, Temple, E.C.
1865	Somerset, Hon. Gen. Crown Hotel, W.C.; and Jamaica.
1830	*Somers, Charles, Earl. 33, Prince's-pale, S.W.; Euston-castle, Herefordshire, and The Priory, Kewgate, Surrey.
1802	1760 Somerset, Capt. Leveson H., H. R.M. Care of Messrs. Child, 3, Clifford-st., Fleet-street, E.C.
1856	*Somers, Joseph, Esq. Portsmere, Murrells-hill, N.
1845	Sopwith, Thom., Esq., M.A., O.E., F.R.S. 103, Victoria-street, Westminster, S.W.
1845	*Southey, H. A. al. Esq. S. C. H., F.R.S. 100, Park-lane, W.
1861	South, John Fint, Esq. Blackheath-park, S.E.
1860	Southey, James Carnegie, Earl of. Finsbury-castle, Brecken, N.E.
1840	*Southey, Jas. Lowther, Esq. Care of Messrs. Stibwell.
1865	Spalding, Samuel, Esq. 7, Upper Park-road, South Hampstead.
1850	*Spencer-Bell, James, Esq. 1, Devonshire-place, Portland-place, W.

Year of
Death.

- 1867 Spicer, Edward, Esq. *Highbury-crescent, N.*
- 1868 1770 Spickernell, Dr. Geo. E., Principal of Eastman's Royal Naval Establishment. *Eastern-parade, Southsea.*
- 1861 Spofforth, Markham, Esq. 3, *Porchester-terrace, W.*
- 1855 *Spottiswoods, William, Esq., F.R.S. 50, *Grosvenor-place, S.W.*
- 1859 *Spratt, Capt. Thos. A. B., R.N., C.B. *Mount Ephraim, Tunbridge-wells, Kent.*
- 1866 Spruce, Richard, Esq., F.R., D.R. *Hurstpierpoint, Sussex.*
- 1859 Stafford, Edward W., Esq. *Colonial Secretary of New Zealand; care of Mr. J. S. Tytler, 19, Castle-street, Edinburgh.*
- 1853 Stanford, Edward, Esq. 8, *Charing-cross, S.W.*
- 1855 Stanhope, Philip Henry, Earl, Pres. Sec. of Antiquaries. 3, *Grosvenor-place-houses, Grosvenor-place, S.W.; and Chavening, Sevenoaks, Kent.*
- 1860 *Stanhope, Walter Spencer, Esq. *Cannon-hall, Barnsley, Yorkshire.*
- 1856 Stanley, Edmund Hill, Esq. *Cromer-hotel, Strand, W.C.*
- 1853 1780 *Stanley, Edward Henry, Lord, M.P., D.C.L. 23, *St. James's-square, S.W.*
- 1863 Stanton, Geo., Esq. *Coton-hill, Shrewsbury; and Conservatives Club, S.W.*
- 1867 Stanton, Henry, Esq. 1, *River-street, Myddleton-square, W.C.*
- 1856 Statham, John Lee, Esq. 60, *Wimpole-street, W.*
- 1863 *Staveley, Miles, Esq. *Old Steningford-hall, Ripon.*
- 1867 Steel, J. P., Esq., Lieut. R.E. *Junior United Service Club, S.W.*
- 1830 *Stephen, Sir George. *Melbourne; care of Mr. H. W. Ravenscroft, 7, Gray's-inn-square, W.C.*
- 1857 Stephenson, Sir R. Macdonald, C.B. 72, *Lancaster-gate, W.; and East-cottage, Worthing.*
- 1866 Stepney, A. E. Cowell, Esq. 8, *St. George's-terrace, Knightsbridge, W.*
- 1860 Sterling, Col. Sir Anthony. *South-lodge, South-place, Knightsbridge, W.*
- 1862 1790 Sterry, Henry, Esq. 7, *Paragon, Southwark, S.E.*
- 1855 Stevens, Henry, Esq., F.R.S. 17, *Henrietta-street, Covent-garden, W.C.*
- 1841 Stevenson, Thomas, Esq., F.R.S. 37, *Upper Grosvenor-street, W.*
- 1866 Stewart, Rev. Dr. James. *Lonedale, Alice, South Africa.*
- 1860 *Stewart, Major J. H. M. Shaw, Royal Madras Engineers.
- 1860 Stirling, Capt. Frederick H., R.N. *H.M.S. 'Hero'; and United Service Club, S.W.*
- 1863 Stirling, Sir Walter, Bart. 38, *Portman-square, W.*
- 1860 Stocker, John Palmer, Esq. 93, *Oxford-terrace, Hyde-park, W.*
- 1845 *Stokes, Rear-Admiral John Lort. *United Service Club, S.W.; and Scotchcell, Haverfordwest, Wales.*
- 1867 *Story, Edwin, Esq., M.A. 30, *Abnorah-road, Downham-road, Islington, N.*
- 1868 1800 Strachey, Colonel Richard, R.N., F.R.S. 29, *Lancaster-gate, Hyde-park, W.*
- 1861 Strange, Lieut.-Col. Alexander. 41, *Brompton-crescent, S.W.*
- 1858 Stragford, Percy Ellen, Viscount. 58, *Cumberland-street, W.*
- 1858 Stratford de Redcliffe, Stratford Canning, Viscount. 29, *Grosvenor-square, W.*
- 1864 Stratton, N. D. J., Esq. *Aylestone, Leicester.*
- 1860 Strickland, Edward, Esq., C.B., Commissary-General. *New Zealand. Care of Messrs. Biddings and Co., 2, Waterloo-place, S.W.*

Year of Election	
1866	Strong, F. K., Esq., <i>a.m.</i> Hamburg, Germany; care of A. Strong, Esq. 41, Lincoln-inn-fields, W.C.
1867	Strutt, George H., Esq., <i>F.R.S.</i> Loughborough
1868	Strutt, Captain Samuel Ingham, <i>F.R.S.</i> Royal Mail Steam Packet Company Southampton.
1869	*Strutt, Captain William. 26, Beakmond-place, Southampton.
1871	*Straslock, Count P. E. de, <i>C.M. F.R.S.</i> 23 Savile-row, W.
1870	Stuart, Lieut. Col. J. F. D. Crichlow, <i>M.P.</i> 25, Witten-crescent, Belgrave-road, N.W.
1871	Stuart, Vice-Chancellor Sir John. 11 and 12, Grosvenor-place, Piccadilly, W.C. 5, Queen's-gate, Hyde-park, W.; and Trusham, Isle of Wight, <i>Intercolonial</i>
1876	Stuart, Major Robert, <i>London, Alabama.</i> Care of Messrs. Doul, Hunter, and Co., 32, Wyndham-street, W.
1878	*Sturt, Capt. Charles, <i>F.R.S.</i> 51, Edmondey, Tenall, Cheshire.
1882	Sturtevant, William, Esq. 15, Lansdown-terrace, Hyde-park, W., and Marlborough-park, Canterbury.
1878	Sturges Lord. 5, Seamore-place, Curzon-street, W.
1877	Sullivan, Deane-Alfred Bartholomew J., <i>Esq.</i> <i>Board of Trade, S.W.</i>
1865	Sullivan, Capt. T. W., <i>C.D.</i> <i>M.A.</i> Knapton, Walsby, North
1862	Sutcliffe, Rev. Henry Arthur Dillon, <i>M.A.</i> 21, Berners-street, W.
1862	1830Sutton, Capt. Charles Leslie, <i>M.P.</i> Chelmsford-house, Long Tinton, Surrey.
1861	*Sutherland, George Tennant William, Duke of Stafford House, St James Palace, S.W.
1846	*Sutherland, Robert, Esq. Curzon Park, Dunsin, Argyshire.
1857	Swamy, Andrew Esq. 38, Cannon-street, E.C.
1830	*Swaburne, Rear-Admiral Charles H. 18, Grosvenor-place, W., and Cypreton near Newcastle-upon-Tyne
1862	*Swanburne, Lieut. Sir John, Bart., <i>K.C.</i> Cypreton, Newcastle-upon-Tyne.
1858	Swinhoe, Robert, Esq., <i>F.R.S.M.</i> Canton, Formosa. Care of Messrs. Smith, Elder, and Co.
1850	Sykes, Christopher, Esq., <i>M.P.</i> Sladmore, Milton.
1851	Sykes, Colonel William Henry, <i>M.P.</i> <i>F.R.S.</i> Hon. <i>M.A.</i> <i>Athenaeum</i> 17, S.W., and 42, Albion-street, Hyde-park, W.
1864	Symonds, F., Esq., <i>M.P.</i> Beaumont-street, Oxford.
1852	1830*Synges, Col. M. Langton H., <i>K.C.</i> Birmingham.
1852	Taggart, Courtenay, Esq. Reform Club, S.W.; and Paris.
1853	Taggart, Francis, Esq. 31, Grosvenor-gardens, Hyde-park, W.
1866	Taitor, Edward C., Esq. (Imp. Customs). <i>Newton, Cheshire</i>
1864	Tait, P. M., Esq. 162, Adelphi-road, N., and Oriental Club, W.
1857	*Tait, Robert, Esq. 14, Queen Anne-street, W.
1867	Talbot, Right Hon. Richard Gilbert. 451, Chester-square, E.W.; and Balshale, Antrim, County Dublin.
1868	Talbot de Malahide, James Talbot, Lord. Malahide Castle, Co. Dublin.

Year of
Death.

- 1861 Tayler, Joseph Walter, Esq.
- 1861 Taylor, Commander A. Dundas, I.N. 6, Nightingale-road, Lower Clapton, N.E.
- 1865 1840 Taylor, H. L., Esq. Reform Club, S.W.; and 23, Phillimore-gardens, Kensington, W.
- 1865 Taylor, Rev. Jas. Hudson. Ningpo, China. Care of Mr. Berger, Saint-hill, East Grinstead.
- 1865 Taylor, John, Esq. Egremont-villa, Lower Norwood, Surrey, S.
- 1864 *Taylor, John Stopford, Esq., M.D. 1, Springfield, St. Anne-street, Liverpool.
- 1863 Taylor, Col. R. C. H. 16, Eaton-place, S.W.; and Carlton Club, S.W.
- 1864 Taylor, W. R., Esq.
- 1867 Teedale, John M., Esq. Eltham-house, Eltham, S.E.
- 1863 Tegg, Wm., Esq. 13, Doughty-street, Mecklenburg-square, W.C.
- 1860 Templeton, John, Esq. 24, Budge-row, E.C.
- 1867 Tennant, Professor James. 149, Strand, W.C.
- 1859 1850 Tennant, Major J. F., Bengal Engrs. Director of the Observatory, Madras. Care of Messrs. Smith, Elder, and Co., Cornhill.
- 1860 *Thatcher, Colonel E.I.C.
- 1865 Theed, William S., Esq. 18, Carlisle-terrace, Kensington, W.
- 1865 Thomas, G., Esq. Queen's-gardens-terrace, Hyde-park, W.
- 1864 Thomas, Henry Harrington, Esq. Lansdowne-crescent, Bath.
- 1864 Thomas, J. R., Esq., Staff Assist. Surg. Castle-hill, Fishguard, Pembrokeshire.
- 1865 Thomas, John H., Esq. Custom-house, E.C.
- 1864 Thompson, William C., Esq.
- 1863 Thomson, James, Esq. Dunstable-house, Richmond.
- 1863 Thomson, James Duncan, Esq., Portuguese Consul. St. Peter's-chambers, Cornhill, E.C.
- 1848 1860 *Thomson, J. Turnbull, Esq., Chief Surveyor. Otago, New Zealand.
- 1866 Thomson, John, Esq. 4, Montague-street, Edinburgh. Care of John Little, Esq., 21, Cannon-street, E.C.
- 1861 *Thomson, Ronald Ferguson, Esq., 1st Attaché to the Persian Mission. Care of F. B. Alston, Esq., Foreign-office, S.W.
- 1864 *Thomson, Thomas, Esq., M.D., F.R.S. Hope-house, Kew, W.
- 1865 Thomson, W. T., Esq. 21, James-street, Buckingham-gate, S.W.
- 1861 *Thorne, Augustus, Esq. 4, Culliam-street, City, E.C.
- 1867 Thornton, Edward, Esq., C.B. Harrow.
- 1847 Thornton, Rev. Thomas Cooke, M.A., M.R.I. Brock-hall, near Weedon, Northamptonshire.
- 1858 Thorold, Rev. A. W. 16, Bedford-square, W.C.
- 1864 Thorold, Henry, Esq. Cuswold, Lincolnshire.
- 1865 1870 Thring, Henry, Esq. 5, Queen's-gate-gardens, W.
- 1861 Thrupp, John, Esq.
- 1859 Thuillier, Lt.-Col. H. L., Surveyor-General of India. Calcutta; Messrs. Grindley, and Co.; Care of J. Walker, Esq., India Office.
- 1865 Thurburn, C. A., Esq. 28, Queensborough-terrace, Kensington-gardens, W.

- Year of Election.
- 1804 *Thurburn, Hugh, Esq. 108, Westbourne-terrace, W.
- 1801 Thorslow, the Hon. Thos. J. Howell *British Embassy, The Hague. Care of J. B. Alton, Esq. Foreign Office, S.W.*
- 1840 *Tindal, Charles John, Esq. *Wmo South Wales.*
- 1838 *Tinne, John A., Esq. *Brickley, Ashburth, near Liverpool.*
- 1862 Todd, John, Esq. *Sydney. Messrs. Hays and Harbottle, 1, Alderman-row, E.C.*
- 1865 Todd, Rev. John W. *Tudor-hall, Forest-hill, Sydenham, S.*
- 1853 1880*Tomlin, George Twiddy, Esq., F.R.S. *Combe-house, Bartonfelde, Canterbury; and Windham Club, S.W.*
- 1853 Tomlin, George, Esq., M.R. 1, Carlton-house-terrace, S.W.
- 1833 *Tooke, Arthur Wm., Esq., M.A. *Pinner-hill-house, near Watford, Middlesex.*
- 1856 Torrington, John, Esq. 3, Chamber-place, Hyde-park-square, W.
- 1860 Torrens, Robert Richard, Esq. 2, Gloucester-place, Hyde-park, W., and *The Cott, Holm, near Ashburton, South Devon.*
- 1858 Townsend, Commander John, R.N. *Lena, Weston-super-Mare.*
- 1860 Townson, Wm. Parker, Esq., D.A. Cantab. *Care of Messrs. Townson, Ash-house, Coton, near Lancaster.*
- 1844 *Towry, George Edward, Esq.
- 1858 Towson, J. Thomas, Esq. *Secretary Local Marine Board, Liverpool.*
- 1864 *Trenbee, Capt. Hy. *Commanding the East-India Ship 'Hesperus' 25, Intermex road, Kensington gardens, W.*
- 1801 1890*Trar, Rev. H. Y., M.A. *Exeter College, Oxford.*
- 1804 Tracy, the Hon. C. H. 11, George's-street, W.
- 1803 *Trevors, Arch., Esq. *Addison-road opposite the Napier-road, Kensington, W.*
- 1867 Trevenchere, Col. C.W., R.E. *Bombay.*
- 1859 Tremlett, Rev. Francis W., M.A. *Belgrave-park, Hampstead, N.W.*
- 1875 *Trench, Capt. the Hon. Le Port R.N. 32, Hyde-park-gardens, W., and *Ordinance Survey Office, Penton, S.W.*
- 1863 Trevelyan, Rev. Frederick *Stansmore-villa Henah-hill, Upper Norwood, S.*
- 1802 Trevelyan, Sir Charles Edward, B.C.L. 8, Grosvenor-terrace, S.W.
- 1890 Trevelyan, Sir Walter Calverly, Bart., M.A., F.R.S., F.R.S.E., &c. *Althorp House, S.W.; Wollington, Northumberland; and Nettleham, Somerset.*
- 1861 Tresselt, Edmund, Esq. *Care of Messrs. Tresselt and Co., New City-chambers, Bishopsgate-street, E.C.*
- 1867 1900*Trinton, Joseph Herbert, Esq. *Bloomfield, Norwood; and 64, Lombard-street, E.C.*
- 1867 Tryon, Capt. George, R.N. *Army and Navy Club, S.W.*
- 1862 Tuckett, Francis Fox, Esq. *Frenchay, near Bristol.*
- 1836 *Tuckett, Frederick, Esq. 4 Mortimer-street, Cavendish-square, W.
- 1805 Tuckett, Philip D., Esq. 113, Piccadilly, W.
- 1852 Tudor, Edward Owen, Esq., F.R.S. 40, Portland-place, W.
- 1857 Tudor, Henry, Esq. 80, Portland-place, W.
- 1864 Turnbull, George, Esq., C.E., F.R.S.E. 23, Cornwall gardens, South Kensington, W.
- 1834 *Turnbull, Rev. Thom. Smith F.R.S. *University Club, S.W.; and Bloisfield, Norfolk.*
- 1863 Turner, Thos., Esq. *Ony's Hospital, Southwark, S.*

Year of Election.	
1867	1910 Tweedie, Capt. Michael, R.A. <i>Care of Messrs. Cox and Co., Craig's-court, S.W.</i>
1864	*Twentyman, A. C., Esq. <i>Tettenhall-wood, near Wolverhampton.</i>
1863	Twentyman, Wm. H., Esq. <i>Manor-house, St. John's-wood, N.W.</i>
1863	*Twisleton, Hon. E. F. <i>Butland-gate, S.W.</i>
1840	Twiss, Sir Travers, D.C.L., F.R.S. 19, <i>Park-lane, W.</i>
1844	Twyford, Capt. A. W., 21st Hussars. <i>Reform Club, S.W.; and Cosham-house, Cosham, Hants.</i>
1865	Tyer, Edward, Esq., C.E., F.R.A.S. 15, <i>Old-jewry-chambers, E.C.</i>
1862	*Tyler, George, Esq. 24, <i>Holloway-place, Holloway-road, N.</i>
1850	Tyler, Capt. W. Fraser. <i>Aldersie, Inverness.</i>
1862	Underhill, Edward Bean, Esq., LL.D. <i>Derwent-lodge, Thurlow-road, Hampstead, N.W.</i>
1861	1920 Umhr, John, Esq. <i>Arthur's Club, St. James's Street, S.W.</i>
1856	*Usiell, Theodosius, Esq.
1844	*Vacher, George, Esq. <i>Manor-house, Teddington.</i>
1861	*Vander Byl, P. G., Esq. <i>Care of Mr. H. Blyth, 17, Gracechurch-street, E.C.</i>
1865	Vane, G., Esq. <i>Ceylon. Messrs. Price and Boustead.</i>
1856	*Vaughan, James, Esq., F.R.C.S., Bombay Army. <i>Builth, Breconshire.</i>
1861	Vaughan, J. D., Esq., Assist. Res. Councillor and Police Magistrate of Singapore. <i>Care of J. Tupp, Esq., 4, Lancaster-road, Notting-hill, W.</i>
1861	Vaughan, Nash Vaughan Edwards, Esq. <i>Rheola, near Neath; and Lansley, near Pontyfield, Glamorganshire.</i>
1849	Vaux, William S. W., Esq., M.A., F.R.S. <i>British Museum, W.C.</i>
1841	*Vavasour, Sir Henry M., Bart. 8, <i>Upper Grosvenor-street, W.</i>
1855	1930 Vavasour, James, Esq. <i>Knockholt, near Sevenoaks, Kent.</i>
1867	Vanner, Capt. Francis John S. 42, <i>Gloucester-place, Hyde-park, W.; and Elm Bank, near Worcester.</i>
1863	*Vareker, the Hon. H. P., LL.D., H.M. Consul at Rio Grande do Sul. 1, <i>Portman-square, W.</i>
1862	Verner, Edward Wingfield, Esq., M.P. 86, <i>Eaton-square, S.W.; and Cook-abbey, Bray, Co. Wicklow.</i>
1862	*Verney, Edmond H., Commr. R.N. 32, <i>South-street, Grosvenor-square, W.</i>
1837	*Verney, Major Sir Harry C., Bart., M.P., F.R.A.S. <i>Travellers' Club, S.W.; 32, South-street, Grosvenor-square, W.; and Claydon-house, Bucks.</i>
1837	Verrey, Charles, Esq.
1844	Verulam, James Walter, Earl of. <i>Gorhambury, near St. Alban's; Barry-hill, Surrey; and Messing-hall, Essex.</i>
1845	Vile, Thomas, Esq. 75, <i>Oxford-terrace, W.</i>
1865	Vincent, Minos C., Esq., C.E. <i>Frankfort, Ohio, U.S., and 337, Strand.</i>

- 1857 1940 Vincent, John, Esq. 4, *Granville-park, Blackheath, S.E.*
- 1858 Vines, William Reynolds, Esq., F.R.S.A. Care of R. P. Hallyer, Esq., 25, *Long-street, London, N.*; and 4, *Thames-st., Holborn-hill, E.C.*
- 1863 Vivian, Major Quintas, late 8th Hussars. 17, *Chester-street, S.W.*
- 1858 *Vyvan, Sir Richard Rawlinson, Bart., F.R.S. *Trelawarren, Cornwall.*
- 1859 Wade, Mitchell B., Esq. 60, *South John-street, Liverpool.*
- 1864 Wade, H. D., Esq. 58, *Clype, Seymour-street, Portman-square, W.*
- 1863 Wade, Thos. E., Esq., C.B., H.B.M. Secretary of Legation. *Peking, China.*
- 1853 *Wagstaff, William Rawster, Esq., M.D., M.A.
- 1863 Waste, Henry Esq. 3, *Victoria-st., Finsbury, S.W.*
- 1864 Wakefield, E. T., Esq. 40, *Pembroke-st., Bayswater, W.*
- 1862 1950 Walker, Col. C. P. Beauchamp, C.B. 97, *Onslow-square, S.W.*; and *United Service Club, S.W.*
- 186 Walker, Edward Henry, Esq. Vice Consul at Tripoli. *Newtown, Chester.*
- 1863 *Walker, Frederick John, Esq. *Thornbury-house, Thornbury, Bristol.*
- 1863 Walker, James, Esq. Managing Director of Madras Railway. 25, *Cambridge-square, Hyde-park, W.*
- 1859 *Walker, Lt.-Col. James, Bombay Engineer. *Murree, near Rawal Pindi, Punjab.* Care of J. Walker, Esq., *India Office.*
- 1830 Walker, John, Esq. Hydrus India Office. 9, *Castle-street, Holborn, W.C.*
- 1861 *Walker, John, Esq. 30, *Liverpool-terrace, W.*
- 1856 *Walker, Captain John, H.M.'s 50th Foot. *Broom-hill, Colchester.*
- 1864 Walker, E. B. N., Esq. Care of Mr. Bassett, 38, *South Circular, Liverpool.*
- 1857 Walker, Robert, Esq., M.D., Ana. Surg. R.S. 6, *Belfield-place, Portobello, Edinburgh.*
- 1866 1960 Walker, Sydney, Esq.
- 1853 *Walker, T. F. W., Esq. 6, *Brock-street, Bath,* and *Athenaeum Club, S.W.*
- 1853 Walker, Captain William Harrison M.C.B. 3, *Gloucester-terrace, W.*; and *Board of Trade, S.W.*
- 1851 Walker, Rev. William. *Grammar-school, Haring Castle, Epton-mare-warren.*
- 1861 Walker, Rev. William Henry, M.A. *Rectory, Shipham, Norfolk.*
- 1856 Walker, William, Esq., F.R.S.A. 48, *Hilbert-road, Epsom-park, N.*
- 1854 Wallace, Alfred Russell, Esq. 9, *St. Mark's-crescent, Regent's-park, N.W.*
- 1861 Wallace, Rev. Charles R. L., M.A. 3 *Hursey-place, Clifton, Bristol.*
- 1854 Walter, George, Esq. *Haus-green, Leam, W.*
- 1853 Walter, Sir Thos. Wathen, Bart. 16, *Easton-square, N.W.*
- 1863 1970 Wallis, George C., Esq., M.D. 11, *Fitch-terrace, Kensington, W.*
- 1854 Walmsley, Sir Joshua, Government Resident Agent. *Natal.*
- 1860 Walpole, Capt. the Hon. F. *Travellers' Club, S.W.*; and *Bainthorpe-hill, Long-Stratton, Norfolk.*
- 1863 Walpole, H. Hon. Spencer, M.P. *Quefton-street, W.*; and *Enning, W.*
- 1856 Walter, Henry Fraser, Esq. *Popplewood-hill, near Nottingham.*

Year of
Election.

- 1865 Walton, H. C., Esq., C.E. 26, Savile-row, W.
- 1863 Walton, J. W., Esq. 26, Savile-row, W.
- 1864 Walton, R. G., Esq., C.E.
- 1853 *Ward, George, Esq.
- 1860 Ward, Admiral J. Hamilton. Oakfield, Wimbledon-park, S.W.
- 1860 1980 Ward, Swinburne, Esq., Civil Commissioner. Seychelles Islands.
- 1861 Wardlaw, John, Esq. 57, Prince's-gate, Kensington, W.
- 1864 Warner, E., Esq., M.P. Higham-hall, Woodford, Essex; and 49, Grosvenor-place, S.W.
- 1859 Warre, Arthur B., Esq. 109, Onslow-square, S.W.
- 1862 Warren, Capt. Richard Pelham. Worting-house, Basingstoke.
- 1867 Waterhouse, George Maraden, Esq. Buckhurst, Wokingham, Berkshire.
- 1852 Watkins, John, Esq., F.R.C.S., F.S.A. 2, Fulcon-square, Aldersgate-street, E.C.
- 1862 Watney, John, Esq. 16, London-street, Fenchurch-street, E.C.
- 1859 Watson, James, Esq. 24, Endsleigh-street, W.C.
- 1860 Watson, James, Esq., Barrister-at-Law. 13, Circus, Bath.
- 1861 1990 Watson, John Harrison, Esq. 28, Queenborough-terrace, Kensington-gardens, W.
- 1867 Watson, Robert Spence, Esq. Moss Croft, Gateshead-on-Tyne.
- 1860 Waite, J. King, Esq. St. Ives, Huntingdonshire.
- 1857 *Wagh, Maj.-General Sir Andrew Scott, Bengal Engineers, F.R.S., late Surveyor-General and Superintendent Great Trig. Survey. Athenæum Club, S.W.; and 7, Peterham-terrace, Queen's-gate-gardens, South Kensington, W.
- 1861 Way, Arthur, Esq. Ashton-lodge, Ashton, near Bristol.
- 1858 *Webb, Capt. Sydney. Oriental Club, Hanover-square, W.; and 24, Manchester-square, W.
- 1860 *Webb, William Frederick, Esq.
- 1860 *Webber-Smith, Colonel James, 95th Regiment. 14, Cambridge-square, W.
- 1865 Webster, Alphonus, Esq. 44, Mecklenburg-square, W.C.
- 1864 Webster, E., Esq. North-lodge, Ealing, W.
- 1858 2000 Webster, George, Esq., M.D. Dulwich, S.
- 1866 Webster, George, Esq. 40, Finsbury-circus, E.C.
- 1860 Weguelin, Thomas Matthias, Esq., M.P. Peninsular and Oriental Steam Navigation Co., Moorgate-street, E.C.
- 1851 Waller, Edward, Esq. 34, Red-lion-square, W.C.
- 1853 *Wallington, Arthur Richard, Duke of, Major-General, D.C.L. Apsey-house, W.; and Strathfieldsaye, Hampshire.
- 1864 Wells, Sir Mordaunt, late Chief Justice Judge, Bengal. 107, Victoria-st., S.W.
- 1862 Wells, William, Esq. 22, Bruton-street, W.; and Redleaf, Penhurst, Kent.
- 1863 Welman, Chas., Esq. Norton-manoor, Taunton.
- 1857 West, Lieut.-Colonel J. Temple.
- 1861 West, Rev. W. De Lancy, M.A., Head Master, Grammar School. Brentwood, Essex.
- 1860 2010 Westlake, John, Esq. 16, Oxford-square, W.
- 1853 Westmacott, Arthur, Esq. Athenæum Club, S.W.

Year of Election	
1844	* Westminster, Richard, Marquis of. 38, Upper Grosvenor-street, W.; Eaton-Aulk, Cheshire; and Molecombe-house, Dorsetshire.
1852	Weston, Alex. Anderson, Esq., M.A. 18, Rutland-gate, Hyde-park, S.W.
1862	Westwood, John, Esq. 8 and 9, Queen-street-place, Southwark-bridge, E.C.
1863	Wetton, Champion, Esq. Somerset-hill, Dorling.
1830	* Weyland, John, Esq., F.R.S. Woodrington-hall, Norfolk.
1866	Wharnciffe, Lord. 15, Curzon-street, W.
1861	Wharton, Rev. J. C. Willeaden vicarage, N.W.
1858	Whentley, G. W., Esq. 159, Leadenhall-street, E.C.
1859	1830 Wheelwright, William, Esq. Gloucester-lodge, Regent's-park, N.W.
1853	* Whitefield, Edward Wrey, Esq., M.A. South Eltington-vicarage, Leam.
1839	* Whitehaw, James, Esq., F.R.S. 18, York-terrace, Regent's-park, N.W.
1867	Whitaker, Thomas Stephen, Esq. Everthorpe-hall, East Yorkshire; and Conservative Club, N.W.
1862	Whitby, Capt. Edward, late 3rd Dragoon Guards.
1857	White, Arthur D., Esq., M.D. 56, Chancery-lane, W.C.
1865	White, Lieut. Arthur Wellesley, M.A. Shorthugues.
1855	* White, Charles, Esq. 1 st , Lime-st., E.C.; and Barnesfield, near Dartford, Kent.
1857	White, Henry, Esq. 5, Lancaster-terrace, Upper Hyde-park-gardens, W.
1862	White, Col. Henry Dalrymple, C.B. 50, Grosvenor-square, S.W.
1866	1830 White, W. A., Esq. Care of E. Herriot, Esq., Foreign Office, S.W. Civil Service Club, S.W.
1852	White, William Foster, Esq. Treasurer, St. Bartholomew's Hospital, E.C.
1863	* White, Wm. O., Esq. 10, Lime-street, E.C.; and Barnesfield, near Dartford, Kent.
1862	Whitehouse, William Matthew Mills, Esq. 46, Clapton-place, Bayswater, W., and Hartncliffe-house, Studley, Warwickshire.
1862	Whitmore, William, Esq. 28, Oxford-square, W.; and Beckenham, Kent, S.E.
1860	Whittle, John Irvine, Esq., D.C.L., LL.D., M.A., C.E., &c. 94, Lower Baggot-street, Dublin; Rushatoun-hall Co. Cairns; and Providence-court, Queen's Co., Ireland.
1865	Whymper, Edward, Esq. Town house, Haslemere.
1864	Whyte, M. B., Esq. 115, St. George's Road, S.W.
1867	William, J. R., Esq. Odeon, S. Warrick. Care of T. P. Cobb, Esq., 8, Crutten-hill-gardens, Hyde-park, W.
1865	Williamson, Alfred, Esq. 11, Euston-place, South Kensington, W.
1860	1840 * Wilkinson, Major A. Eastfield M.A. 64th Commission, India; and Army and Navy Club, S.W. "Proceedings" to 7, Grosvenor-gate, Brighton.
1854	Wilkinson, Frederick E., Esq., M.A. Rydenham, Kent, S.E.
1865	Wilkinson, Dr. G. 4, St. John's-wood-village, St. John's-wood, N.W.
1865	Wilkinson, J. J., Esq. 4, St. John's-wood-village, St. John's-wood, N.W.
1849	* Wilks, Sir John Gordon, D.C.L., F.R.S. Athenaeum Club, S.W.
1866	Wilks, Thomas, Esq. Tumbare, Madras. Care of Mr. C. B. W. W. 49, Renshaw-street, Liverpool.

Year of
Election.

- 1857 Willcock, J. W., Esq., Q.C. 6, *Stone-buildings, Lincoln's-inn, W.C.*; and *Rosenstead, Avenue-road, St. John's-wood, N.W.*
- 1863 Williams, Frederick, G. A., Esq. *Chapel-stairs, Lincoln's-inn, W.C.*
- 1856 Williams, Henry Jones, Esq. 10, *Hereford-street, Park-lane, W.*; and 82, *King William-st., E.C.*
- 1856 Williams, Henry R., Esq. *Board of Trade, S.W.*
- 1857 2050 Williams, Major-General Sir Wm. F., Bart., K.C.B., D.C.L., Commander-in-Chief, Canada. *Army and Navy Club, S.W.*
- 1867 Williams, W. Rhys, Esq., M.D. *Royal Bethlehem Hospital, S.*
- 1859 Willoughby, Henry W., Esq. 85, *Montagu-square, W.*
- 1867 Wills, William Henry, Esq. (J. P. for city and county of Bristol). *Hawthornden, Clifton Down, Bristol.*
- 1861 Wilson, Captain Anthony. 55, *Moorgate-street, E.C.*; and 11, *Chepstow-villas, Baywater, W.*
- 1865 Wilson, R., Esq. *Hayes-place, Bromley, Kent.*
- 1865 Wilson, Capt. J. C., R.N. *Care of Messrs. Woodhead and Co.*
- 1862 *Wilson, Robert Dobie, Esq. 15, *Green-street, Grosvenor-square, W.*
- 1854 *Wilson, Captain Thomas, R.N.
- 1860 Wilson, Thomas, Esq. 121, *Southgate-road, N.*
- 1866 2060 Wiltshire, Rev. M. A., F.G.S., F.L.S. *The Rectory, Bread-street-hill, E.C.*
- 1867 Windham, Capt. S. Smyth. 14, *Connaught-place, Edgeware-road, W.*
- 1861 Windus, Commander Alfred Tubb, L.N. 14, *St. James's-square, S.W.*
- 1862 Wing, Commr. Arthur, R.N. *Care of Messrs. Case and Loudensack.*
- 1863 Wingate, T. F., Esq. 20, *Down-street, Piccadilly, W.*
- 1861 Wingfield, Sir Charles John. *Commissioner in Oude, 10, Great Cumberland-street, Hyde-park, W.*; and *Athenaeum Club, S.W.*
- 1864 Wodehouse, J. H., Esq., H.M.'s Commissioner and Consul-General for the Sandwich Islands. *Care of F. B. Alston, Esq., Foreign Office.*
- 1860 Wolfe, Capt. William Maynard, R.A. *Arts Club, Hanover-square, W.*
- 1866 *Wolff, Sir Henry Drummond, K.C.M.G. 15, *Rutland-gate, S.W.*; and *Athenaeum Club, S.W.*
- 1863 Wood, Hy., Esq. 10, *Cleveland-square, Hyde-park, W.*
- 1865 2070 Wood, Lieut.-Colonel Wm., R.M. 4, *Hyde-park-terrace, Cumberland-gate, W.*
- 1857 Woodhead, Captain H. J. Plumridge. 44, *Charing-cross, S.W.*
- 1862 Woods, Samuel, Esq. *Bedford-park, Croydon.*
- 1864 Woolcott, Geo., Esq. *Cavendish Club, W.*; and 60, *Gracechurch-street, E.C.*
- 1860 Woolrabe, F., Esq. *Tuzmania.*
- 1863 Worms, George, Esq. 17, *Park-crescent, Portland-place, W.*
- 1845 Worthington, Rev. James, D.D. 27, *Jahn-street, Bedford-row, W.C.*
- 1856 Worthington, J. Hall, Esq. *Alton-hill, Oxton, near Birkenhead.*
- 1866 *Worthington, Richard, Esq. 7, *Champion-park, Denmark-hill, S.*
- 1857 Wortley, Rt. Hon. Jas. Stuart, Q.C. 29, *Berkley-sq., W.*; and *Shorn, Surrey, S.W.*
- 1861 2080 Wortley, the Hon. J. F. Stuart. 15, *Curzon-street, Mayfair, W.*
- 1866 Wotton, William G., Esq.

Year of Election.	
1863	Wright, John, Esq., C.E., F.S.A. 11, <i>Park-st., Westminster, S.W.</i> ; and <i>Rochester.</i>
1839	*Wyld, James, Esq., M.P. <i>Charing-cross, W.C.</i>
1863	Wyld, W. H., Esq. <i>Foreign Office, S.W.</i>
1867	*Wythes, George Edward, Esq. 22, <i>Westbourne-terrace, Hyde-park, W.</i>
1854	Yeats, John, Esq., LL.D. <i>Clayton-place, Peckham, S.E.</i>
1861	York, Most Rev. William Thomson, Archbishop of. <i>Bishopsthorpe, York.</i>
1859	Yorke, Lieut.-General Sir Charles, K.C.B. 19, <i>South-st., Grosvenor-square, W.</i>
1830	*Yorke, Colonel Philip J., F.R.S. 89, <i>Eaton-place, S.W.</i>
1861	2090 Youl, James A., Esq. <i>Wardah-house, Clapham-park, S.</i>
1857	*Young, Capt. Allen. <i>Riversdale, Twickenham, S.W.</i>
1838	*Young, Charles Baring, Esq. 4, <i>Hyde-park-terrace, W.</i>
1866	Young, Francis, Esq. 10, <i>Queen's-row, Grove-lane, Camberwell, S.</i>
1830	*Young, George Frederick, Esq. <i>Linthouse, E.</i>
1862	Young, Sir Henry E. Fox, C.B. 77, <i>Kensington-gardens-square, W.</i>
1830	*Young, James, Esq.
1858	Young, James, Esq. <i>Lime-field, West Calder, Midlothian.</i>
1808	Young, John, Esq., F.S.A. <i>Vanbrugh-fields, Blackheath.</i>
1865	Young, Rev. R. H., B.A. 22, <i>South-street, Durham.</i>
1857	2100 Yule, Col. Henry, Bengal Engineers. <i>Messrs. Grindlay & Co., 55, Parliament-street, S.W.</i>
1865	Yule, Rev. J. W. <i>Alexandria, Egypt.</i>
1864	Zwecker, J. B., Esq. 37, <i>Torriano-avenue, Camden-road, N.W.</i>

lxxviii Institutions presented with 'Journal' and 'Proceedings.'

EUROPE—continued.

PARIS	Bibliothèque Impériale	STOCKHOLM	Royal Academy of Sciences.
—	Département de la Guerre	STRASBURG	Société des Sciences Naturelles
—	Département de la Marine	TÜBINGEN	University Library
—	Ministère de la Marine et des Colonies	* URUNKANT	Royal Diet Meteorological Institute
—	Société Asiatique	VENICE	Academy of Sciences
—	Société d'Ethnographie	VIENNA	Imperial Academy of Sciences
—	Ministère de l'Industrie Nationale	—	Geographical Society
—	de Géographie	—	Geological Institute
PESTH	Hungarian Academy of Sciences	ZÜRICH	Society of Antiquaries of Naturalists
* PRAGUE	Bohemian Royal Museum		
ROME	Accademia dei Lincei		
ST. PETERSBURG	Imperial Academy of Sciences		
—	Imperial Geographical Society		

ASIA.

BOMBAY	Geographical Society	MADRAS	Literary and Philosophical Society
—	Asiatic Society	SHANSHAI	Royal Asiatic Society (North China Branch)
CALCUTTA	Asiatic Society of Bengal	SINGAPORE	Journal of Indian Archaeology
—	Geological Survey of India		
CALCUTTA	Public Library		
KORRACHIE	Gen. Lib. and Museum		

AFRICA.

CAIRO	Egyptian Society
CAPETOWN	The Public Library

AMERICA.

ALBANY	New York State Library	PHILADELPHIA	Academy of Natural Sciences
BOSTON	American Society of Arts and Sciences	—	American Philosophical Society
—	Massachusetts State Library	—	Franklin Institute
—	Public Library	QUEBEC	Library of the Parliament of Canada
—	Society of Nat. History	* TORONTO	Department of Public Instruction for Upper Canada
BRASIL	Historical and Geographical Institute of University of	—	Canadian Institute of Congress Library of
CHILE	University of	WASHINGTON	Southwestern Institution
MEXICO	Geographical and Statistical Society of	—	National Observatory
NEW HAVEN	Yale College Library	WORCESTER	Antiquarian Society
—	Shuman's Journal		
NEW YORK	Geographical and Statistical Society		

AUSTRALASIA.

* ADELPHI	South Australian Institute.
MELBOURNE	Public Library.
—	Mining Department.
* VICTORIA	Royal Society
NEW ZEALAND	Library of the House of Representatives
SYDNEY	University Library.
TASMANIA	Royal Society.

NAMES OF INDIVIDUALS TO WHOM THE ROYAL PREMIUMS AND OTHER TESTIMONIALS HAVE BEEN AWARDED.

- 1831.—Mr. RICHARD LAMBER, for the discovery of the course of the River Niger or Quorra, and its outlet in the Gulf of Benin.
- 1832.—Mr. JOHN BISHOP, for the discovery of the land now named "Enderby Land" and "Graham Land," in the Antarctic Ocean.
- 1833.—Captain Sir JOHN ROSS, R.N., for discovery in the Arctic Regions of America.
- 1834.—Sir ALEXANDER BURNES, for the navigation of the River Indus, and a journey by Baluch and Bokhara, across Central Asia.
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The Author.

Diagram of Chinese Tartary. Constructed by Capt. C. George, R.N., and Mr. E. C. East, from the most recent authorities. May, 1867. Size 9 ft. by 16 ft. Scale 8 1/2 inches = 1 degree.

Capt. EDWARD OSBORN, R.N., C.D.

A Chinese Map of China, on 64 sheets.

A Chinese Map of the Province of Shan-si.

Dr. J. LAMPREY.

Map of the Inner City of Peking, on silk. 1866.

HENRY KESSEN and EDWARD TAYLOR, Imperial Customs Service.

Plan of the English Settlement at Shanghai. Surveyed, lithographed, and published in 1846, by order of the Municipal Council of Shanghai. Scale 1 inch = 200 feet.

J. POOK, Esq., & Co.

INDIA—

Results of a Scientific Mission to India and High Asia. Part 4. By Hermann de Schlegel, Adolphus, and Robert de Schampin. We L. London, 1866.

SECRETARY OF STATE FOR INDIA.

Map of the Tea Countries of Assam and Cachar. By Major Briggs, late Superintendent Engineers. By W. and A. K. Johnston. Edinburgh. Scale 1 inch = 12 miles (stat.).

A. K. JOHNSTON, Esq.

Map of the Eastern Portion of British Burmah and Burmah Proper, showing various States from Mandalay to the Siam Straits. Compiled by W. Montgomery Ferguson, from authentic documents, MS. October, 1862. Scale 1 inch = 7 miles (geo.).

Col. A. FAYRE, Commissioner of Tenasserim.

Irrigation Map of the Madras Presidency, compiled from information furnished by superintending engineers for the Secretary of State for India. Scale 1 inch = 8 miles.

C. R. MARRAS, Esq.

Outline Map of the Madras Presidency, to illustrate the projects contained in the proposed Budget for 1866-67. Scale 1 inch = 12 miles.

C. R. MARRAS, Esq.

Province of Marathas, from Marathas to Tonkin. Surveyed and compiled by A. Halley from 1833 to 1850 in charge of Survey Marathas Province. Mo linan, 1850. Scale 1 inch = 5 1/2 miles.

Col. A. FAYRE.

Map of the Province of Pegu. Compiled by Lieut. E. C. Williams, Lieutenants and Officers of the Pegu Survey, from a large scale information. December, 1855. Scale 1 inch = 7 miles (geo.).

Col. A. FAYRE.

Eight Maps of part of the Punjab. By Capt. D. B. Robinson, Bengal Engineers. 1853 to 1857. Scale 1 inch = 1 mile.

M. & C. Co., Ltd.		D. & C.	
No. 1.	District of Rawal Pindi.		
" 2.	" Jhelum and Rawal Pindi.		
" 3.	" Jhelum.		
" 4.	" Rawal Pindi.		
" 5.	" Jhelum Pind and Jhelum.		
" 6.	" Jhelum and Shalipoor.		
" 7.	" Rawal Pind, Jhelum, and Shalipoor.		
" 8.	" Jhelum, Shalipoor, and Lora.		

Lieut-Colonel D. R. Robinson, Deputy Engineers.

Map of the Neighbourhood, Koonah, and Wynand, to illustrate the progress of Canehana Cultivation up to July, 1866. By Clement R. Markham. Scale 1 inch = 2 miles stat. The Author.

JAPAN

Japanese Map of the Empire of Japan.

Japanese Map of the City of Yedo.

J. S. Cowan, Esq., F.R.G.S.

INDIA

Sketch Map showing the Route taken by Mr Colvill from Buxire, following the Coast-line to the Port of Lagah. Scale 1 inch = 13.6 miles geo.

Rough Map of Lieut-Col. Goldsland and Major Smith's Route from Tephah to Choubur and Bander Athas. Scale 1 inch = 26 miles geo. Lieut-Col Goldsland.

RUSSIA

Map of the Khirghiz Steppe and Regions of the Orenburg and Siberian Kirgizes, &c. conforming with the Central Asian Possessions. Scale 1 inch = 52 miles geo. SECRETARY OF STATE, WAR OFFICE.

SINCE

Outline Map showing the Boundary of the Siamese and British Territories. Kras, May 15th, 1864. Scale 1 inch = 52 miles geo. 2 copies. Col. A. FITCH.

TURKISTAN

Central Asia, mapped on the basis of the most recent Surveys that have been made by British and Russian Officers. Compiled under the superintendence of Lieut-Col. J. F. Walker, Jr. Superintendent of Great Trigonometrical Survey of India, 1866. Scale 1 inch = 42 miles geo. C. R. MARKHAM, Esq.

A Tearing of the Southern Portion of the Sea of Aral, showing the Delta of the Amu Daria, or Oxus River, from a Russian Pamphlet. Map-room, R.G.S.

TURKEY

Sketch Map of a Journey made in August, September, and October 1866, down the Southern and Eastern of the river Lychnus and its principal Tributary, the K. or Karpas River. Also Sources of K. and Imrak or Haya, and those of the Mezour or Deyrum River, and the Tournabegzek So. With Route through the Deyrum Dagh. By Constantine L. Taylor. Durbach, 1867. Scale 1 inch = 7 miles geo. The Author.

Carte de l'Asie Mineure, contenant les Itinéraires de P. de Tchibatchef, en 1863, tracés par H. Kiepert. Scale 1 inch = 2.4 miles geo. A. PETRICHAK, Esq.

Carte Géologique de l'Asie Mineure. Par P. de Tchibatchef. Gotha, 1867. Scale 1 inch = 2.4 miles geo. Sir L. L. MONTGOMERY, Bart., F.R.S., &c.

Maps, Charts, &c.

Donors.

Trigonometrical Survey of part of Mesopotamia from Sheriat el Beytha to Te Uruhun, with the Rivers Euphrates and Tigris. By Commandeur W. B. Selby and Lieut. J. B. Bowsher, &c. 1862-3. Scale 1 inch = 2 miles geo.)

Map of the Holy Land. Constructed by C. W. M. Van de Velde, late Lieut. Dutchman. On 8 sheets, with pamphlet. 2nd edition. Gotha. 1865. J. J. VAN DE VELDE, Esq.

Carte de la Terre Sainte, dessinée par A. de Mandrot, Lieut.-Colonel à l'Etat Major fédéral, d'après Van de Velde, Deshayes &c. 1867. Scale 1 inch = 12 miles geo.) Prof. P. CHATEL.

Carte du Cours inférieur du Jourdain, de la Mer Morte et des régions qui l'avoisinent. Dressée par Lieut. Vignes et Dr. Combe pendant leur voyage avec M. le Duc de Luynes en 1864. Paris, 1868. Scale 1 inch = 3.25 miles geo. The Author.

Carte du Wady Arabah et du Lit du Wady el Jelh. Dressée par Lieut. Vignes et Dr. Combe pendant leur voyage avec M. le Duc de Luynes en 1864. Paris, 1865. Scale 1 inch = 3.25 miles geo.) The Author.

Originalkarte des Theiles von Palästina zwischen Jaffa und Jerusalem, mit besonderer Berücksichtigung der vor-handenen und projectirten Communicationen, nach Originalzeichnungen und mit Hinzufügung der neuesten Aufnahmen und Vermessungen, von Conrad Schick. A. Petermann, Gotha, 1867. Scale 1 inch = 1.5 miles geo. Dr. A. PETERMANN.

AFRICA.

GENERAL.—

Stanford's Library Map of Africa, constructed by A. Keith Johnston, &c. &c. London, 1866. Scale 1 inch = 94.34 miles stat. E. STANFORD, Esq.

EASTERN.—

Sketch showing the Discoveries of Captains Burton, Speke, and Grant, and Sir S. W. Baker, and their relation to the Sources of the Nile. By A. G. Findlay, Esq. 1867. A. G. FINDLAY, Esq., &c. &c.

WESTERN.—

Liver Vista.—Das Südwestliche Ewe-Sprachgebiet nach Original-Zeichnungen der Missionare Ch. Hornberger und W. Brutschin, nach den neuesten englischen Aufnahmen der Küste und des Vata Flusses. By A. Petermann. Gotha, 1867. Scale 1 inch = 10 miles geo.) A. PETERMANN, Esq.

Map Illustration M. de Chailly's Route in Equatorial Africa. 1864-65. Scale 1 inch = 10.2 miles geo.) The Author.

Angola.—Mapa Coordenado pela Visconde de Sá da Bandeira, Tenente General Ministro da Guerra, e por Fernando da Costa Leal, Tenente Coronel de Mossamedes. Lisboa, 1863. Commodore A. P. E. WILMOT, &c.

SOUTHERN.—

Das Capland nebst den Süd-Afrikanischen Provinzen und dem Gebiet der Hottentotten und Kaffern. Von A. Petermann. Gotha, 1865. Scale 1 = 5,000,000. The Author.

Map of the Zulu and adjacent Country, compiled from information obtained by Capt. Wainman, &c. &c. the Government Resident Agent. Natal, 1866. Scale 1 inch = 12 miles geo.)

MS Chart showing the Temperature of the Currents off the Cape of Good Hope. By Capt. H. Teylbee, &c. &c. Scale 1 inch = 3° equatorial. The Author.

AMERICA.

NORTH—

Arctic Regions—

A Chart of the Arctic Regions. Published by the Admiralty 1850. Framed and varnished. JOHN BARROW, Esq., R.N.A.

A Map, in five compartments, showing the Exploration of Smith Sound, by Bylot and Hall in 1656; Koenig in 1658; Ingfield in 1659; Kane in 1853-54; and Hayes in 1856-57. By A. Petermann Esq. Göttingen 1867. Scale 1 inch = 55.3 miles geo. THE AUTHOR.

North American and Vancouver Island.

15 Maps of Vancouver Is. and British Columbia—

No. 1. MS. Map of K. Ilesima Say Is. Vancouver Island, with the Native Names of every portion of the Coasts, Rivers, Inlets &c., from an Original Survey by the late Arthur Clarke, Esq. R.N.A. With Additional Notes by Robert Brown. Original MS. never published. Scale 1 inch = 1 mile.

No. 2. MS. Sketch of the Country between Kayakot Inlets on the Western side of Vancouver Island and the Nassau River on the Eastern Coast from the Original Sketch by Lieut. Ralph Hooker, R.N., in the Surveyor-General's Office in Victoria, V. I. With Notes by Robert Brown. Scale 1 inch = 1 nautical mile.

No. 3. MS. Map of the Country between Nanaimo Sound and Barclay Sound, V. I., from a reconnaissance by the V. I. Exploring Expedition under the command of Robert Brown in August and September, 1864. Scale 1 inch = 1 mile geo.

No. 4. MS. Map of the Central Lake, Kleezoot Lake, Stumps or Moon-hold River, and Kleezoot River, V. I. From an original Exploration by Robert Brown, June 1863, November 1863, and continued October 1864. Original.

No. 5. MS. The same as above. Scale 3 miles 1 inch. By Alex. S. Bannister, under the direction of Robert Brown. October, 1864. Original.

No. 6. MS. Sketch of Country from Port Augusta to Alberts V. I., from Exploration by Robert Brown. September and October, 1864.

No. 7. MS. The same as above. More detailed. Original Sketch.

No. 8. MS. Sketch of the Nanaimo River and Lakes V. I. Drawn from reconnaissance, by Thomas A. Smith. Frequent Indian Haunts of the V. I. Exploring Expedition.

No. 9-11. MS. Original Sketches of the Route explored under the orders of Robert Brown, between Nanaimo and Barclay Sound. Drawn by Alex. S. Bannister, under the direction of Peter John Leach.

No. 12. Original MS. sketch of Sooke Lake and portion of the River, V. I., by Tessa Annette, Indigenous Indian.

No. 13. MS. Sketch of the Ojichcoot Indian Country, V. I., exhibiting their fishing and hunting grounds adjoining the Kleezoot River and Lake, with the Native Names, &c. From a reconnaissance by Robert Brown. Original.

No. 14. MS. Map of the whole of Vancouver Island. Compiled from the Admiralty Survey of the Coast Line by Capt G. H. Richards, R.N. With the addition of Nitinat Coast by Robert Brown, the greater portion of the Interior by the first V. I. Exploring Expedition under the command of Robert Brown, 1864, and Mr. Brown's private explorations in 1865 in addition to the reconnaissance by T. Hooker in 1865, Hamlet of Moffatt (M.B.C.), in 1862, and Lieuts. Mayne and Hooker,

Maps, Charts, &c

Plans.

n.s., 1861. Drawn by John Battle, under the direction of Robert Brown.

No. 15. Map of the whole of the Southern District of British Columbia, Compiled and printed in the Office of Land and Works, New Westminster. On 7 sheets, Scale 1 inch = 10 miles stat.

No. 16. Map of the Country from Hope to Similkameen and Stave Creek and Lillooet to Kaedoope and Okanagan Lakes, British Columbia. Compiled by the Royal Engineers at New Westminster. Scale 6 miles to 1 inch.

No. 17. Map of British Columbia from New Westminster to Lillooet. By the Royal Engineers. Scale 10 miles to 1 inch.

No. 18. Portion of Vancouver Island and Barclay Sound. By Capt G. H. Richards, R.N. (Printed at New Westminster, British Columbia, 1861.)

No. 19. Another portion of Vancouver Island and Barclay Sound. By Capt G. H. Richards, R.N. Printed at New Westminster, British Columbia, 1861. Mr. R. W. Brown.

Map of the Gold Regions of the Fraser River and the Washington Territory. By James Wyld, London, 1866. Scale 1 inch = 24 miles geo. W. HOLLAND, Esq.

UNITED STATES.

Map of the States and Territories west of the Mississippi River to the Pacific Ocean. By G. W. and C. B. Colton. New York, 1866. Scale 1 inch = 21 miles geo.

A New Map of the States of California and Nevada. By Leander Hanson and A. J. Doubtless. 1866. Scale 1 inch = 24 miles (geo.)

MEXICO.

Das Kaiserreich Mexico. By E. Ravenstein. 1865. Scale 1 inch = 109½ miles (geo.) The Author.

CENTRAL.

Central America und die Antillen. By E. G. Ravenstein. 1865. Scale 1 inch = 109½ miles geo. The Author.

Maps relating to the various proposed Lines for Inter-oceanic Canals and Railroads between the Waters of the Atlantic and Pacific Oceans. By Admiral C. H. Davis. Washington, 1866. 17 maps, accompanied by a Report. Gustav Weitzel, Esp. Secretary of the U.S. Navy.

SOUTH.

General.

Karte von Süd-America. By E. G. Ravenstein. 1866. (On 2 sheets. Scale 1 inch = 109½ miles geo.) The Author.

Argentine Confederation.

Mapa del Teatro de la Guerra Actual que comprende toda la Provincia de Corrientes y partes adyacentes de Entreríos, Paraguay, Uruguay, y Brasil. Revuado por D. Francisco Ravi. 1865. Scale 1 inch = 17½ miles (geo.)

Carta Geografica de la Provincia de Corrientes y parte de la Republica de Paraguay. Published by the Topographica Department of Buenos Ayres, 1866. Scale 1 inch = 17½ miles (geo.)

Carta del Entre Rios. Por Nicolas Cronasoso, Ingeniero. Buenos Ayres, 1862. Scale 1 inch = 11½ miles (geo.)

T. J. LUTHERSON, Esq., British Consulate, Rosario.

Map showing the Line of the Central Argentine Railway from Rosario de Santa Fe to the City of Corrientes. Plan of the Lands ceded to the Central Argentine Railway by law of May 25th, 1864. Designed by Adolfo M. de Laberge, &c. Scale 1 inch = 7 miles geo.

Maps, Charts, &c.

Donors.

SOUTH—

Brazil—

Aufnahme des Oberen S. Francisco und Rio das Velhas (Brasilien), von Emanuel Luis. Gotha, 1866. Scale 1 inch = 9·9 miles (geo.).

A. PETERMANN, Esq.

Chile—

Mapa de la Provincia de Valdivia segun los datos de la estadística que se han podido recoger hasta ahora construida por Capt. Bernardo E. Philippi. 1846. Scale 1 inch = 8 miles (geo.).

Indicaciones para perfeccionar el Mapa de la Provincia de Valdivia segun los recuerdos de un reciente viaje al Volcan de Osorno, por Guillermo Döll. Valdivia, 1852. Scale 1 inch = 4½ miles.

Plano de la Ciudad y Puerto de Valparaiso. Hamburg, 1854. Scale 1 inch = 500 feet.

W. BOLLAEET, Esq.

Pers—

MS. Map of part of the Province of Tarapaca, from Port Conajagua to Ojaica.

Plano de la Ciudad de Lima. Hamburg, 1850.

W. BOLLAEET, Esq.

AUSTRALIA.

Plan showing the track made by J. G. Macdonald from Carpentaria Downs Station (supposed head-waters of Lynd River) to the Albert River, being the result of private enterprise, commenced August 31, ended October 24, 1864. Scale 1 inch = 10 miles (stat.).

Sir G. BOWEN.

Das See'n Gebiet (Lake Distrikt) und die Steinige Wüste (Great Stony Desert) im Innern von Australien. By B. Hassenstein and A. Petermann. Gotha, 1867. Scale 1 inch = 13·8 miles (geo.).

A. PETERMANN, Esq.

NEW ZEALAND.

MIDDLE ISLAND—

Map of the Province of Canterbury, showing the five Routes between the East and West Coasts. MS. By J. Haast, Esq. Scale 1 inch = 10 miles.

Section No. 1. North Rakai Route; from River Hokitika, on West Coast, by Browning Pass, to River Avon, East Coast.

Section No. 2. Whitcombe Route; from the River Hokitika, on West Coast, by Whitcombe Pass, to River Avon, East Coast.

Section No. 3. Oira Route; from River Arahura, on West Coast, by Arthur Pass, to River Avon on East Coast.

Section No. 4. Hurunui Route; from River Teramakau, on West Coast, by Harper Pass, to River Avon on East Coast.

Section No. 5. Wanaka Route; from River Haast, on West Coast, by Haast Pass, to River Opihi on East Coast.

The above 5 Sections on the scale of 1 inch = 2000 feet vertical, 3 miles horizontal.

A Comparative Diagram showing Sections of the above Routes from the West to the East Coast; Province of Canterbury, New Zealand, on the same scale as the Sections.

Section from Banks' Peninsula to the Western Slopes of Mount Cook.

J. HAAST, Esq.

Accessions to the Map-Room

Hepa, Clark, &c

Р. 725.

Map of the Province of Otago. By J. T. Thomson Chief Surveyor, and Assistant Survey Officer, Dunedin, Otago, 1866. Scale 1 inch = 12 miles (stat.). The Acmeo-

INDIAN OIL CAN.

Chart of the Nicobar Islands. By Commodore Wallerstorf Ubböe,
Austrian frigate Noron. 1858.

Chart of the Pearl Banks off Tutucorin and Trichendoor. By C. R. Markham, Esq. Scale 1 inch = 1½ mile. The Author.

PACIFIC OCEAN.

Die Marquesas Inseln. By A. Petermann. Gotha, 1867. Scale 1 inch = 40 miles geo. The Author.

CHARTS.

Prison Animals—

Section 1.

No. 74 The Scilly Isles (England, East Coast).
1544 Yarmouth and Lowestoft Roads (England, East Coast).
2750 Skjort Læs (Denmark, West Coast).
2793 Cowes Harbour (Isle of Wight).

Section 5.

No. 2973 Gulf of Mex.

Section 5.

No. 142 Trapani to Marsala (Sicily, West Coast).
 213 Santa Maria Islands, and Cephalonia Islands.
 241 Bay of Navarin (Greece).
 1159 Sonasa to Melah Ah Africa, North Coast).
 1162 Sphax Roadstead (Coast of Tunisia).
 1464 Genoa (Italy, West Coast).
 1567 Port Argentan (Ionian Islands).
 1606 Santa Maria Roadstead at Port Drepano.
 1620 Porto Vathi and Vathi (Ionian Islands).
 1676 Gulf of Patras (Greece).
 1687 Messina (Harbour Sicily).

Section 8.

No. 260a River St. Lawrence Montreal to Farnen Point).
2596 Farnen Point to Kingston
343 Lunenburg to Mary Head Nova Scotia.
1007 Cay Brumby to Lower Massachusetts Cay (Florida).
1008 Lower Massachusetts Cay to Green Grass Cay
2402 Fletcher's Neck to Cape Cod United States.
2400 Point to Fletcher's Neck United States.
2800 Port Royal and Calibogue Sounds South Carolina, U.S.

Section 7.

No. 1 British Isles to the Mediterranean Sea
1241 Ice Chart of the Southern Hemisphere.

李士珍 著

No. 794 Island of Trinidad to Los Hoques West Indies.
446 Jamaica Island West Indies.
479 Mount of Antiquities in Samaria
408 Acapulco Bay, St. Domingo West Indies
461 Berpeton's Mount, Trinidad Island West Indies.

Maps, Charts, &c.

Donors.

- No. 492 San Fernando Anchorage, Trinidad Island (West Indies).
486 Jamaica, with parts of Cuba and St. Domingo.

Section 9.

- No. 1949 The Rocas, Coast of Brazil (South Atlantic).
2522 St. Catharina Island to Rio de la Plata.

Section 10.

- No. 538 Seymour Narrows (Vancouver Island).

Section 11.

- No. 15 Harbours in the Red Sea, South of Jiddah.
178 Plans of Anchorages on the Coast of Barbary.
638 North bank of the River Congo, &c.
677 East Coast of Madagascar, &c.
686 Pénérive (Madagascar, East Coast).
1228 Kowie River (Africa, South Coast).
2523 Red Sea.

Section 12.

- No. 43 Gulf of Kutch (India, West Coast).
50 Katiawar Coast, from Diu Head to Gaspmath Point.
51 Gulf of Cambay (India, West Coast).
735 India, West Coast. Sheet 1. Surat Roads to Maruli.
736 " " " " 2. Maruli to Arnol Island.
737 " " " " 3. Arnol Island to Kudari Island.
738 " " " " 4. Kudari Island to Bankot.
739 " " " " 5. Boris Pagoda to Achira River.
740 " " " " 6. Achira River to Cape Ramas.
744 " " " " 7. Cape Ramas to Alvagudda.
745 " " " " 8. Alvagudda to Molky.
747 " " " " 10. Mount Dolly to Calicut.
749 " " " " 11. Lat. 9° 50' to 11° 2' N.
750 " " " " 12. Cundacudvoo to Anjengo.
751 " " " " 13. Anjengo to Cape Comorin.
825 Andaman Islands.
2621 Bombay Harbour (India, West Coast).
2736 Gulf of Kutch to Visvadroog (India, West Coast).
2760 Sumatra, West Coast (Sheet 1).

Section 13.

- No. 895 Allas Strait (Indian Archipelago).
911 Cajeli, Saparoea, and Amboina Bays.
914 Waygiou Island (Moluccas).
930 Plans of Anchorages in the Moluccas.
947 Victoria Harbour (Labuan Island).
1019 South Coast of Hainan Island (China, South Coast).
1269 Saigon, or Don-nai River (Cochin China).
1963 China, East Coast (Sheet 3).
2454 Northern portion of the Island of Luzon.
2578 Eastern part of the Sulu, or Mindoro Sea.
2640 Java Sea (Western part).

Section 14.

- No. 1025 Tacking Point to Coff's Island (Australia, East Coast).
1026 Solitary Islands and adjacent Coast (Australia, East Coast).
2027 Coff's Island to Evans' Head (Australia, East Coast).
1028 Evans' Head to Danger Point (Australia, East Coast).
1068 Moreton Bay to Sandy Cape (Australia, East Coast).

Section 15.

- No. 1101 Mariana or Ladrone Islands (North Pacific).
1114 Auckland and Campbell Islands (South Pacific).

Accessions to the Map-Room.

<i>Maps, Charts, &c.</i>	<i>Donors.</i>
1251 Ngau Island and Mumbolithe Reef (Fiji Group).	
1380 New Caledonia, New Hebrides, and Loyalty Islands.	
1780 Samoan or Navigator Islands (South Pacific).	
The Hydrographic Office, through Capt. G. H. Richards, R.N., Hydrographer.	

MISCELLANEOUS.

- Bust of the President, Sir R. I. Murchison, Bart., M.C.B., in marble, by Miss Amelia R. Hill, S.S. Edinburgh, 1866.
Sir R. I. MURCHISON, M.C.B.
- Sketches of the Shevaroy Hills and Pulni Mountains. On 24 sheets. By Lieut.-Col. Douglas Hamilton. London, 1865. The India Office.
- A View of the Village at Pitcairn's Island, showing the descendants of the Mutineers of the *Bounty*, as discovered by Capt. F. W. Beechey, in H.M.S. *Blossom*, in 1828. Drawn by W. Emyth, Mate of *Blossom*, Dec. 20, 1828. J. BARROW, Esq., F.R.S.
- Photograph of H.M.S. *Bombay*. Vascello Inglese Incendiato nella Riviera della Plata, il 14 Dicb^a 1864, con perdita di Q. Uff^o e 91 Marinari. Eduardo di Martini, Ufficiale della R. M. I. Dipinto dal vero Sulla Pyro Corvetta *Ercola*. Capt. F. A. B. CRAWFORD, R.N.
-

INSTRUMENTS LENT TO TRAVELLERS.

To the late **Mrs. L. DUNCAN**, Vice-Consul at Whydah, in 1849—

Telescope.
Two Compasses.
Aneroid Barometer.

Dr. P. C. SUTHERLAND, M.D., F.R.S., at Natal—

Brass Sextant (7½-inch), with Silver Arc, by Troughton and Simms.
Strong-framed Artificial Horizon, by Troughton and Simms.
Two Barometers (Mountain), with improved Iron Cases, by Newman.

The late **Dr. E. I. ISYHO**, M.D., F.R.S., at Abeokuta—

Pocket Chronometer, by Barraud and Land.
Barometer (Mountain), by Troughton and Simms.

Dr. D. LEVINGSOHN, M.D., F.R.S., Zambesi, Eastern Africa—

Sykes's Hypsometrical Apparatus, No. 1, with Sling Case, by Cassella.
Standard Thermometers, 0 to 212, in Brass Cases, " "
" " in Morocco Cases, " "
Artificial Horizon, with Sling Case, " "
Prismatic Azimuth Compass, silver ring, with leather Sling Case, "
Rain Gauge.

Dr. D. WALKER, M.D., F.R.S., Russian America, Dec. 8, 1863—

Sextant, 4 in. radius, by Cary.
Artificial Horizon, Circular, by Cary.
Azimuth Compass, by Elliot.

The late **Mrs. JULES GERARD**, Upper Guinea, towards Timbuktu, Feb. 4, 1863—

Sextant, 3-inch radius, by T. Jones.
Aneroid, white metal, by Spencer, Browning, and Co.
Artificial Horizon, spirit-level, by Elliot.
Boiling-water Apparatus, and three Thermometers in brass tubes.
Azimuth Compass, by Burdett.
Two small Pocket Compasses.
Protractor, brass, 2-in. radius.
" " (The above in Leather Case.)
Measuring Tape, 50 feet.
Thermometer, on metal, in Morocco Case.
Protractor, horn, circular.

H. WHITELY, Esq., in South Peru, March 28, 1867—

Pocket Aneroid, No. 29, graduated to 15 inches, by Cary.
Hypsometrical Apparatus, and 3 Boiling-point Thermometers, by Cassella.

E. WATKINS, Esq., Greenland, Disco Island, &c., February 28, 1867—

Sextant, 6-inch radius, divided to 10', by Cary.
Artificial Horizon, " "
Azimuth Compass and Stand, " "
Pocket Aneroid, by Messrs. Beck and Co. "
" " Chronometer, No. 835, Brockbank and Atkins.

Rev. F. W. HOLLAND, Sinal, June 25, 1867—

Prismatic Compass and Stand, by Cary.
Pocket Aneroid, graduated to 15 inches, " "
Hypsometrical Apparatus, and 3 Thermometers, B.P.
Two Thermometers, divided to 230° for hot springs.
Three Alpine minimum Thermometers.

perform the pleasant duty of receiving from your hands this evidence of the high appreciation of Admiral Bontakoff's labours by the Royal Geographical Society, in a region which, even at the present time, is so very little known to the scientific world. The kind approval, which Admiral Bontakoff's works have met at the hands of an Institution so widely known and esteemed in Russia, and of which you are, Sir, the honoured President, will undoubtedly be a source of mutual advantage in the cause of science, and will encourage our Russian geographers to seek a closer acquaintance with your Society, by offering their works in a version more accessible to English scientific readers than the Russian language, so that you will be better able to follow and judge of the progress of geographical researches in Russia, as carried on by your sister institution in St. Petersburg; at the head of which, as you are well aware, is His Imperial Highness the Grand Duke Constantine. I shall lose no time in forwarding to Admiral Bontakoff this Medal, and I only regret that I cannot express his thanks to the Royal Geographical Society, and to you, Sir, in so admirable a manner as he would have done himself, if he were here."

The President next addressed the Hon. C. F. Adams, Minister of the United States, in the following words:—

"Mr. Adams,

Eleven years have elapsed since the Royal Geographical Society did honour to itself by awarding a Gold Medal to your highly distinguished countryman the late Dr. Kane, for his discoveries in the Polar Regions, while in charge of an expedition generously fitted out in the United States to search for Sir John Franklin: and now I rejoice to say that I have to ask you, as the Representative of the great American Republic, to receive the Medal of our Patron, Queen Victoria, which has been designed to honour of your countrymen, Dr. Hayes, for having reached a more northern point of Arctic land ($81^{\circ} 35'$) than ever was attained by any previous explorer.

"Forming one of the previous expedition of the lamented Kane, who justly received the applause not only of your country but of the civilised world, Dr. Hayes was on that occasion the discoverer of a large mass of land forming the extreme western shore of Smith Sound, to which the name of Henry Gannell, an enlightened citizen of New York, the mainspring of that expedition, was most appropriately attached. It was for carrying personal observations to a degree and a half farther northward on land than on the previous occasion, and for having sighted the open Polar Sea from the western shore of Kennedy's Strait, just as Kane's com-

person Morton had done from the eastern or Greenland shore of the same, that our Council has most deservedly adjudicated to him our Patron's Medal.

"The scientific results of this expedition have been to a great extent made known in America, and the Smithsonian Institution has undertaken the publication of those important additions to our acquaintance with the natural history, terrestrial magnetism, and meteorology, as well as the geography of the Arctic Regions.

"In the mean time the unpretending volume of our Medallist, entitled the 'Open Polar Sea,' is written in so clear, manly, and attractive a style, as must render it very popular among all readers in the British Isles and America.

"Just as we know that our old Baffin first discovered and navigated in a very small craft the great bay separating Greenland from America, with which his name has ever since been connected, so the extremest point where these waters lead into what was called the 'Open Polar Sea' has been reached by the small American schooner of Dr. Hayes bearing the name of the 'United States.'

"In pursuing the narrative of the hair-breadth escapes of this little vessel when beset by huge floating icebergs, the skill with which she was managed, the stern resolution and ability with which every difficulty by sea or by land was overcome, and the rich scientific fruits which were brought back, with the loss only of the able Mr. Sontag who made most of the astronomical observations, I may well congratulate your Excellency on the success of a voyage which will ever be remembered among the many great exploits of your countrymen.

"I have now only to request you to convey this Victoria Medal to Dr. Hayes, with the request that he will accept it as the strongest proof we can offer of our just appreciation of his great merits."

Mr. ADAMS replied:—

"Mr. PRESIDENT, It gives me great pleasure to be the medium of presenting to Dr. Hayes the honourable memorial which your Society has voted to him for his services in the cause of science. It is no part of my province to undertake to vaunt any of my countrymen; but I will say that, in no part of the world will you find more people who watch with greater attention and admiration the brave enterprises for public objects which are undertaken in any part of the world. More especially by their natural connexion, in all the essential elements of civilisation, with this community, their attention is closely drawn to every movement which takes

place here; and following the admiration with which they see what has been done, there grows a desire to emulate the same themselves. It has been often objected to enterprises of this kind, that they can lead to nothing—that they are in their nature, simply adventures in quest of things that are impossible. But, Mr. President, the same remark might have been made when Columbus first undertook his voyage to the West—to what, he did not know. He thought it might come out somewhere in far Cathay; but the result was, as often happens in life, an unexpected one—and the unexpected turns out to be of greater proportions than anything which had been anticipated. Thus it was that America was discovered, and the influence of that discovery upon the fortunes of the world remains yet to be fully measured. And so it has been with most of the adventures that have been started from the Old World for the discovery of that which was unknown. Very often the explorers do not arrive at what was anticipated, but then they attain to a great deal which was not expected, and which has at the same time proved of very great value. And more than that, and greater than all, this pursuit has led to the cultivation and development of high moral qualities in a class of men, who become themselves greater heroes and greater benefactors to the interests of the world than most conquerors who have been lauded in the pages of history. I therefore, Mr. President, accept this Medal with great pleasure, and I have no doubt that this marked testimony to the merits of one individual will be felt not only by him, but by all that class of individuals who, at their own cost and expense, carried on his enterprise. It will, moreover, stimulate them to repeat such efforts in emulation of your countrymen, by which the bounds of science may still further be indefinitely extended."

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A D D R E S S

to

THE ROYAL GEOGRAPHICAL SOCIETY.

Delivered at the Anniversary Meeting on the 27th May, 1867.

By SIR RODERICK IMPEY MURCHISON, BART., K.C.B.,

PRESIDENT.

GENTLEMEN,

I meet you with the satisfactory announcement that great as was the number of our members at the last anniversary, it has since then considerably increased, and now amounts to 2120 Fellows.

I have also the satisfaction of reminding you that, thanks to the zealous and efficient services of our Assistant Secretary, Mr. Bates, the well-filled volume of the year has been, like the last, for some time in your hands.

The general observations on the progress of Geography which I shall lay before you in the following Address will, as usual, be preceded by brief notices of those of our deceased associates who have taken any part in geographical researches or publications, as well as by a review of the Admiralty Surveys prepared by Capt. Richards, the Hydrographer.

OBITUARY.

In justice to an eminent geographer who has been taken from us, I begin the sad record (much less heavy, however, than that of last year), with a notice of the career of

Sir George EVEREST.—This distinguished Indian surveyor and geographer was the son of Tristram Everest, Esq., of Gwornvale, Brecon, and was born on the 4th July, 1790. He began his scientific education at Marlow and completed it at Woolwich, where he passed a brilliant examination, and was declared fit for a commission at an earlier age than the limit fixed by the regula-

tions. Selling for Bengal as an artillery cadet in 1806, the first important service in which he was engaged was in executing a reconnaissance survey of the Island of Java, for which duty he was selected by the famous Sir Stamford Raffles, during the occupation of the island by the British from 1811 to 1816. During this period Everest gained the friendship of our honoured associate Mr. John Crawford, who, happily, is still amongst us, after a distinguished career in the East, particularly in connexion with the Malay Archipelago.

On his return to Bengal, Everest was employed by the Government in various engineering works, particularly in the establishment of a telegraph system, between Calcutta and Benares. It was not long, however, before he entered upon a service of more immediate connexion with Geographical science; for in 1818 he was appointed chief assistant to Colonel Lambton, the founder of the Great Trigonometrical Survey of India. It will not be considered out of place here, if I mention that this colossal undertaking owes its origin to the late Duke of Wellington, who recommended it and gave it his cordial support, so acting Colonel Lambton to carry it out. How much an accurate survey was needed, was shown by the earlier results of the operations, an error of 40 miles being detected in the breadth of the peninsula as previously laid down.

Captain Everest was first employed in the triangulation of the eastern part of the Nizam's dominions, where the unhealthy climate and close application to his duties so affected his health that he was ordered to the Cape of Good Hope to recruit. He did not, however, remain idle, for he employed his leisure in investigating the circumstances appertaining to the Abbé de la Caille's arc, and his researches formed the subject of a paper, published in the first volume of the '*Transactions of the Astronomical Society*.'

On the death of Colonel Lambton, in 1823, Captain Everest succeeded to the vacant post of Superintendent of the great Survey. He applied himself with such unremitting ardour to the extension of the great arc series of measurements, that his health again gave way, and he was obliged to seek rest and change for a time in England.

In 1830 he returned to India, provided, by the liberality of the Court of Directors, with an equipment of geodetical instruments and apparatus for the continuance of the survey, in the construction of which the most skilful makers had been employed. He had made himself acquainted during his visit with the English Ordnance

survey system, and with every modern improvement in geodetical matters that had taken place in Europe. Thus provided, and in the prime of life, Colonel Everest returned to his great task. In addition to the duties of Superintendent of the Trigonometrical Survey, he had now to perform those of Surveyor-General of India, to which office he had been appointed by the Court of Directors; a union of offices which vastly increased his labours.

Between the years 1832 and 1841 the measurements of the great arc were carried on, and in December of the latter year closed by the completion of the Beder base-line, a work accomplished by his chief assistant, Captain (now Sir Andrew Scott) Waugh. The whole Indian arc from Cape Comorin to the Himalayas was thus completed. These elaborate operations were fully detailed in Colonel Everest's work on the 'Measurement of two Sections of the Meridional Arc of India,' published in two quarto volumes in 1847; a work which gained for its author a high reputation.

In summing up the labours of Sir George Everest I cannot do better than quote the expressive words used when the Asiatic Society of Bengal nominated him an Honorary Member. "Of the many works executed under Colonel Everest's direction, the most important, and that by which he will be best known to posterity, is the northern portion of the great Meridional Arc of India, $11\frac{1}{2}^{\circ}$ in length. No geodetic measure in any part of the world surpasses, or perhaps equals, in accuracy this splendid achievement. By the light it throws on researches into the figure and dimensions of the earth, it forms one of the most valuable contributions to that branch of science which we possess, whilst, at the same time, it constitutes a foundation for the geography of Northern India, the integrity of which must for ever stand unquestioned. Colonel Everest reduced the whole system of the Great Trigonometrical Survey of India to order, and established the fixed basis on which the geography of India now rests."

After Sir George Everest's departure from India in December, 1843, and retirement from the service, his successor, Sir Andrew Scott Waugh, took an opportunity of paying a well-deserved compliment to his former commanding officer, by naming after him the highest mountain measured in the Himalayas—namely, Mount Everest, whose height is 29,002 feet.

At the conclusion of his active career in India, and on settling in England, it was quite natural that all scientific Societies should have wished to do honour to such a man. He therefore naturally became

a Fellow of the Royal Society, an active supporter of the Royal Institution, but especially was he appreciated by Geographers, inasmuch as he was for many years one of our most honoured associates in the Council of this Society, and one of the most distinguished scientific Geographers who ever held the office of Vice-President.

Professor Henry Rootes was a distinguished Geologist of the United States, who for the last years of his life became quite naturalised among us, and was indeed Professor of Natural History in the University of Glasgow at the time of his death.

His chief work, entitled '*The Geology of Pennsylvania, with a General View of the Geology of the United States*,' in 3 vols 4to., was illustrated by so well-defined a map of the whole region of the United States, that even in this Society his name must be ever mentioned with respect.

Besides the delineation of the boundaries of all the principal geological formations in the States, his sections are most ably drawn in showing how the strata of the Appalachian chain have been folded over and over, and how the whole have been violently affected, and in many cases reversed in their order, particularly in contact with igneous and metamorphic rocks of the eastern seaboard.

The Rev George Cecil Rexford, Rector of Swasey, near Rochester, who died on the 15th February last, in his eighty-seventh year, was one of the oldest Fellows of our Society, and during ten years (1836 to 1846) acted most efficiently and zealously as Foreign Secretary. In early life, after leaving Cambridge, he fulfilled the duties of Chaplain to the British Embassy at Constantinople, and, after an interval in England, went back to Turkey as Chaplain to the Factor at Smyrna, which appointment he held to 1814. On returning to Cambridge, he was elected Professor of Arabic in that University. His acquaintance with the geography and languages of the East rendered him a most leading and useful member of the Asiatic and Geographical as also of the Syro-Egyptian and Numismatic Societies.

In regard to his incessant labours to correct and improve all the publications in our volumes which related to Comparative Geography, or to Asiatic and African subjects, I can bear full testimony that this good and learned man laboured successfully for others in the advancement of knowledge, without looking for praise or endeavouring to gain any reputation for himself. As an editor his per-

erently was invaluable, as shown by all the papers on classical or general Geography which passed through his hands.

His kindly manners and true modesty endeared him to every one of the Council with whom he acted, and when he spoke on any moot point, he was as logical in his deductions as he was accurate in his facts.

An excellent parish priest, he united the utmost purity of life with a simple and guileless nature, chartered by a feeling of reverence as deep as it was real; for, disliking metaphysics, he always maintained that Faith has its own high region whither Reason cannot follow it.

Sir STUART DONALDSON, who died on the 11th of January, 1857, was brought up to commercial pursuits, his brother the late Dr. Donaldson, Head Master of the School at Bury St. Edmunds, having been one of the most accomplished scholars of our day. At an early age he went to Mexico, where he remained some years, and acquired a knowledge of the Spanish language, which he spoke with fluency. About the year 1830 he went to Australia, and was engaged at Sydney as a merchant for many years.

On the establishment of Representative Institutions in the colony he became a Member of the Legislature, in which, being a ready and successful speaker, he took a prominent place. When responsible Government was set up in the Australian Colonies (1850) he became Colonial Treasurer, and on his return to England, in 1859, he received the honour of knighthood. Among his good deeds he is to be remembered as one of the original Members of the Senate of the University of Sydney, in the foundation and conduct of which he took, as I am informed by Sir Charles Nicholson, a very important part, as well as in other colonial establishments.

When he came among us here, we who knew him became soon attached to him, for his warm, cheerful, and genial manner; whilst at our convivial parties his fluency and energy as a speaker will be always remembered. In short, both in Australia and at home, this open-hearted, generous man has left many friends to deplore his loss in the prime of life, and when he was striving to obtain a seat in the British Parliament.

It is not within my province to endeavour to do justice to the various claims which many other deceased Fellows have unquestionably laid to public recognition, irrespective of geographical science and researches. A mere enumeration, however, of the names of

those who have been taken from us, many of whom were of high reputation in other spheres, will indicate how well the Royal Geographical Society is supported by men of all classes in the British dominions. In this meagrely list are the following:—The Marquis of Camden, K.G., D.C., one of our original members; the second Marquis of Lansdowne, son of our much lamented Founder; Lord Northbrook, well known as Sir Francis Baring, K.C., who, when First Lord of the Admiralty, was a good supporter of Arctic exploration and Lady Franklin's efforts; Mr. T. Alcock, formerly M.P.; Mr. Joseph Beldam; Mr. Charles Baring; Captain John Chapman, R.A.; Mr. Daniel Clark; Mr. John Dobie, K.C.; Mr. George Doland; Mr. Peter Dickson; Sir Alexander P. Gordon-Cumming, Bart., of Altyre; Mr. J. Gilchrist; Mr. Charles Pascoe Grenfell, many years M.P.; Mr. Robert Carr Glynn; Major J. P. Napier Hewitt; Mr. Jacob Herbert; the Rev. C. Hudson the ardent Alpine explorer, who lost his life on the Matterhorn; Mr. F. S. Humphrey; Mr. R. Hanbury, M.P.; Captain Clement Johnson; Commander Jones-Ryrom, R.N.; General Sir Harry Jones G.C.B., a highly-distinguished officer of Engineers and lately Governor of the Royal Military College; Mr. C. H. C. Plowden; Mr. Thomas Plann, K.C., formerly M.P. and latterly Judge-Advocate of the Fleet, and Councillor of the Board of Admiralty; Major Patrick Stewart distinguished for his engineering services under Lord Clyde in the Indian war, and also in the laying down of the great telegraphic line through Persia to Hindostan; Mr. J. F. Pike-Seriver; Mr. H. S. Dazley Smith; the Rev. W. Brownrigg Smith M.A.; Mr. John Stewart; Mr. Alexander Trotter, the brother of the lamented explorer of the Niger; Mr. John Taylor; Mr. Thomas Vardon; Mr. C. Willich, and the Right Hon. John Wynn.

ADMIRALTY SURVEYS.* The Admiralty Surveys both at home and abroad have been carried out during the past year with energy and success, and the results compare favourably with those of any preceding year. The following sketch will convey an idea as to how the force has been distributed, and the amount of work which has been accomplished.

Coasts of the United Kingdom. Captain E. J. Bedford, with his three assistants in the *Lightning* have been employed in the Bristol Channel. They have completed a new Survey of Cardiff Roads, and

* By the Hydrographer, Captain G. H. Richards, R.N.

remain for us to fill up. As to the Korea, it is at present almost a sealed book.

The *Serpent*, a ship of war under the orders of the Commander-in-Chief in China, commanded by an able surveying officer, Commander Bullock, performs also the duties of an auxiliary surveying vessel when necessary or the exigencies of the service will admit, and many valuable contributions to the hydrography of the China Seas have been received from Commander Bullock, more especially connected with the coasts of Japan.

Strait of Mandellan.—It was also stated in our last report that in withdrawing the second vessel from the Mediterranean Survey now approaching completion, it was the intention of the Admiralty—considering the importance of this Strait as a line of steam communication between the Atlantic and Pacific Oceans, and the comparatively little that was known of those extensive channels leading northwards into the Gulf of Persia from its western entrance—to undertake a thorough examination of this region. The *Nereus*, commanded by Captain Mayne, sailed accordingly from England on this service in the fall of the past year, and, from our latest information, had commenced her work under favourable circumstances and with the cheerful co-operation of the Chilean Government.

West Indies.—This Survey, which is carried on by hired vessels and boats, has been in abeyance during the last year, owing to the officers who had been many years employed on it having returned to England. It has, however, been resumed under its former commanding officer Mr. Parsons, Master-at-Law, who, with two assistants, now commence the Surveys of Barbadoes and Montserrat.

Bermuda.—A small surveying party under Mr. Langdon, Master-at-Law, has been for some time engaged in sounding the various channels between the reefs of this group, the increased draught of water of our ships rendering diving operations occasionally necessary to remove coral patches.

The *Gannet*, a ship of war on the West India Station, commanded by an experienced surveying officer, Commander Chimmo, is also engaged in surveying operations, when other duties will permit. Commander Chimmo has, during the past season, completed the survey of the Gulf of Paria and other portions of the Island of Trinidad, and made large plans of the entrance known as the "Serpent's Mouth," and the anchorage of San Fernando.

The *Gannet*, and gunboat *Minstrel*, under Commander Chimmo,

assisted by Mr. Searnoll, Master R.N., have completed the soundings of the Bay of Fundy, and thus brought to a close the survey of Nova Scotia.

Newfoundland.—This survey, under Mr. J. H. Kerr, Master R.N., and carried on in a hired vessel has made steady progress during the last year. Mr. Kerr and his assistants also rendered essential service to the expedition which laid the Atlantic cable of 1866, by buoying the course of the cable, and by pointing and assisting with their local knowledge the squadron which assembled in Trinity Bay on that occasion.

British Columbia. Mr. Pender, Master R.N., in charge of this survey, with two assistants, has been employed during the past year, with a hired vessel, in surveying the intricate and hitherto little known channels between the north end of Vancouver Island and the northern boundary of the British possessions, in 54° 45' N. lat. and has made good progress with this work; he has also surveyed the bar and harbour at the eastern entrance of the Skidegate Channel in Queen Charlotte Island, as well as made plans of several useful anchorages, not before known, on the shore of the mainland. The bar at the entrance of the Fraser River has also been re-surveyed, in consequence of material changes which had occurred in the depth and direction of the channel.

Cape of Good Hope.—The survey of the shores of this Colony has rapidly advanced towards completion under Staff-Commander Stanton, during the past year; and, with the assistance of H. M. S. *Rapier*, Commander Stubbs, afforded him by Commodore Caldwell, the soundings between Storm River and Cape Recife have been satisfactorily completed.

Colonial Surveys.—*Victoria*.—Captain Cox having retired from the charge of this survey, after a long and useful service of more than thirty years in the surveying branch of the profession, has been succeeded by Commander Wilkinson, who, with his assistants during the past year, has made considerable progress in the survey of the exposed outer coast of this part of Australia having completed from Port Phillip westward to within a league of Cape Otway. The Government of Victoria have wisely placed the Colonial steamer *Victoria* at Commander Wilkinson's disposal for this duty during the last few months, the advantage of which over the former system of working in a small sailing vessel is apparent in the increased progress of the survey, and should it be found practicable to continue this advantage to the surveying of ours, we may expect at no distant

time to have the whole seaboard of this colony completely and satisfactorily surveyed.

New South Wales.—Captain Sidney, in charge of this survey, has, with his two assistants, made very good progress during the past year. The coast between Sydney and Port Stephens, a distance of 80 miles, has been very carefully examined and charted. A re-survey of the harbour of Newcastle, rendered necessary by the changes in the banks and channels, has also been made, and the harbour of Port Stephens has likewise been completed.

Queensland.—The progress of the regular survey of the coasts of this colony has been somewhat interrupted, owing to changes among the officers; Staff Commander Jeffery has retired from the charge of the survey, and his assistant been transferred to another colony. Mr. Bedwell, Master R.N., has succeeded to the charge, and without any assistant has completed 60 miles of the shores of Moreton Bay, and sounded over 180 square miles of ground.

Any loss of time, however, which has been sustained through the causes above named has been more than compensated for by the energy and ability of Commander Nares, of the *Salamander*, who, while employed on special service between Brisbane and the new settlement of Somerset at Cape York, has lost no opportunity of adding to our hydrographical knowledge of those parts of the Eastern coast of Australia which had only been partially examined before, and since our last report Commander Nares has surveyed the eastern coast of Hinchinbrooke Island, the Palm Island Group, and Cleveland Bay.

The examination of the southern and eastern shores of the Gulf of Carpentaria by the *Salamander* was postponed during the last season, from press of other duties; but it has probably been carried out ere this.

South Australia.—The little vessel employed on the survey of the coast of South Australia had, as stated in our last year's report, been transferred for a very considerable time, at the request of the Colonial Government, to the north and north-western coasts of Australia in connection with the formation of new settlements. Latterly Mr. Howard, Master R.S., who was in charge, together with his assistant, Mr. Guy, have been able to add considerably to our knowledge of those shores, and have charted the coast between Cape Coker, the north-east point of Coburg Peninsula and Cape Stewart, a distance of 250 miles. All this coast has been fairly sounded and several new dangers accurately determined and laid down, as well as detailed

plans made of Mountnorris Bay and the Liverpool River. The vessel has now returned to Adelaide, and Commander Hutchison, having resumed the charge of the survey, has commenced his work on the eastern side of Spencer Gulf, 70 miles of the coast of which, southward of Cape Elizabeth, including a part of Port Victoria, have been already completed.

Summary.—During the year 1866 sixty-eight new charts have been engraved and published, noteworthy among which is that showing the Agulhas Bank and the coast of the Cape of Good Hope from Hendeklip Bay to Port Natal. Upwards of 1050 original plates have been added to and corrected, and 138,900 charts printed.

Sailing Directions for the approaches to the China Sea and Singapore, by the Straits of Sunda, Banca, Gaspar, Carimata, Rhoe, Varella, Durian, and Singapore, as well as the annual light books, tide tables, and azimuth tables, have been published.

CONTINENTAL PUBLICATIONS.—Independently of the Societies established in many of the capitals of Europe for the promotion of Geographical Science, the chief source of information has been, as in former years, Perthes' '*Geographische Mittheilungen*,' so ably conducted by our Honorary Associate, Dr. A. Petermann. Although the past year appears not to have been remarkable for any great discoveries in our science, many memoirs of considerable interest have been published in this important serial. Amongst these more especially deserving of mention is an article entitled '*Das Nordliche Land der Erde*' (1867, Part v.), which contains a *résumé* of the geographical and cartographical results of all the North Polar Expeditions in the neighbourhood of Baffin's Bay from 1616 to the last journey of our Medallist, Dr. Hayes, in 1831. The paper is illustrated by an excellent comparative map, which gives a clear view of the successive additions to our knowledge of this portion of the Arctic regions. A memoir by the well-known Siberian explorer and naturalist M. Radde, is also well worthy of especial mention, describing the chief results of his travels and botanical researches in the Caucasus in the year 1865. This, together with a memoir by Otto Finsch, '*On the Geographical Distribution of Parrots*' ('*Mittheilungen*,' 1867, Part i.), illustrated by a map, coloured to show the ranges of the genera and families, furnish striking examples of the close connection of botanical and zoological distribution with our favourite science. Other papers worthy of attention are, Foyér's '*Investigation of the Ortler Alps*;' Colonel E. von Sydow's

View of European Cartography in 1865 and 1866, an article by the learned Editor, advocating warmly the establishment of a German Society for the promotion of geographical expeditions; and, lastly, 'Altitude measurements of the Rocky Mountains in Colorado Territory,' in which it is shown that Pike's Peak and other culminating points are exceeded in height by peaks in the Sierra Nevada range of California, as measured by the Geological Survey of that State.

Grundemann's Missionary Atlas. A special Atlas devoted to the illustration of the Geography of Protestant Missions, and compiled by Dr. Grundemann, is now in course of publication, in German and English editions. The first parts, containing maps of several districts on the West Coast of Africa, have already appeared, and the work seems likely to prove very useful to all those who are interested in the progress of missions in little known parts of the world, especially as the maps contain much detail and are in a convenient and portable form.

AFRICA.—Dr. Livingstone.—During the last few months our thoughts have been directed, with painful interest, to the last enterprise of our eminent associate, Livingstone. For reasons which I have explained at our evening meetings, and also through the public press, I have never admitted that there existed any valid proof whatever of the death of that great traveller. And now that Arab traders have arrived from a spot close to the reported scene of the murder, long after the event was said to have taken place, and brought to the Sultan of Zanzibar the intelligence that he had passed safely into the friendly Babina country to the westward, and that a report has arrived at Zanzibar that a white man had reached the Lake Tanganyika, we have fresh grounds for hoping that he may now be pursuing his journey in the interior. In truth, we have recently obtained good evidence of the mendacity of the man Merou, on whose statement alone the death was reported: it being known that he has given one version of it to the Consul and Dr. Kirk at Zanzibar, and also to the British resident at Johanna, and an entirely different one to the Deputy examined, on his return to Bombay, by Colonel Rigby. We have, therefore, the strongest grounds for disbelieving the story altogether, and for hoping that our great traveller has passed safely through the intermediate country and reached the Lake Tanganyika, the great object of his mission.

Already Livingstone, by crossing the northern end of his own

Lake Nyassa, has determined one important point in respect to the watershed of South Africa, for he has proved, according to Dr. Kirk, that this great sheet of water here terminates, and is not connected with the more northerly Lake Tanganyika. If he has been spared, as we all hope, he has before him as grand a career as was ever laid out before an African explorer; it being now probable that Tanganyika, a fresh-water sea which must have an outlet, is connected on the north with the Albert Nyanza of Baker and others leading to the Nile system. For although Burton and Speke estimated the height of Lake Tanganyika to be 11,000 feet above the sea—the Albert, or lower lake being, according to Baker, 2720 feet—many persons, mistrusting the results obtained by the use of a bad thermometer, still think it probable that the Tanganyika may communicate through a gorge in the mountains at its northern end with the Albert Nyanza of Baker; for both these waters lie in the same meridian.

Pursuing this subject, our associate Mr. Findlay, after a comparison of the altitude observations of Burton and Speke, on the first East African expedition, those of Speke and Grant on the second, and of Baker on his great journey to the Albert Nyanza, has prepared a memoir in which he endeavours to prove that these various altitudes are not inconsistent with Tanganyika being the furthestmost lake of the Nile system, with an exit into Albert Nyanza. This important argumentative memoir will be read to us at our first meeting after the Anniversary.

For myself, I give no opinion on a question which, like many others respecting African geography, can really be decided by positive survey only. Let us, then, trust that Livingstone has been enabled to solve this singularly interesting problem.

In the mean time, not believing in the death of Livingstone on the sole testimony of one of his cowardly baggage-bearers who fled, and who has already given different versions of the catastrophe, I am sure the Society and the public will approve of the course I recommended, and in which I was cordially supported by the Council, and, to their great credit, by Her Majesty's Government, namely, to send out a boat expedition to the head of Lake Nyassa, and thus ascertain the truth. If by this exhaustive search we ascertain that, sceptical as we are, the noble fellow did fall at that spot where the Johanna man said he was killed, why then, alas! at our next anniversary, it will be the sad duty of your President, in mourning for his loss, to dwell upon the wondrous

achievements of his life. If, on the contrary, we should learn from our own envoys and not merely from Arab traders, that he has passed on into the interior (and thus we shall ascertain in six or seven months), why then, trusting to the skill and indomitable pluck of Livingstone, we may be assured that, among friendly Negro tribes who know that he is their straddled friend, he may still realize one of the grandest geographical triumphs of our era, the connection of the great Tanganyika with the waters of the Nile system.

But even here I would have my countrymen who are accustomed to obtain rapid intelligence of distant travellers not to despair if they should be a year or more without any news of our uncounted friend. For, if he be alive, they must recollect that he has with him a small band only of faithful negroes, no one of whom could be spared to traverse the wide regions between Lake Tanganyika and the coast. Until he himself reappears—and how long was he unheard of in his first great traverse of Southern Africa!—we have, therefore, little chance of knowing the true result of his mission. But if as I fervently pray he should return to us, with what open arms will the country receive him! and how rejoiced will your President be, if he lives, to preside over as grand a Livingstone festival as he did when this noble and intrepid traveller was about to depart on his second great expedition.

The party which I have announced as about to proceed to Eastern Africa, to procure accurate information concerning Livingstone, will be commanded by Mr. E. D. Young, who did excellent service in the former Zambesi expedition in the management of the *Lady Nyasa* river-boat. With him will be associated Mr. Henry Faulkner, a young volunteer of great promise, and two technical men, one a mechanic and the other a seaman. The expedition, I am happy to say, is warmly supported by Her Majesty's Government, and the building of the boat is rapidly progressing under the orders of the Board of Admiralty. The boat will be a sailing one, made of steel, and built in pieces, no one of which will weigh more than 50 lbs., so that the portage of the whole by natives past the catamarans of the Shire will be much facilitated. The Government have arranged for the transport of the party to the Cape with the boat and stores by the African mail steamer on the 30th of next month.*

* To the credit of the Union Steam Packet Company, the boat has been taken out for £1,000. Whilst these pages are passing through the press, I learn that the party sailed from Plymouth on the 11th instant—JAN. 12, 1867.

Arrived there, one of our cruisers will take them to the Inabo mouth of the Zambesi, where the boat will be put together and the party—having engaged a crew of negroes—will be left to pursue their noble and adventurous errand, by the Zambesi and the Shire, to the head of the Lake Nyassa. On account of the heavy seas which prevail on the western or leeward side of that lake, the expedition will keep close to its eastward shore, hitherto unexplored, and it is expected it will reach Kampanda, at the northern extremity, by the end of October, and there ascertain whether our great traveller has perished as reported, or has passed forward in safety through Cazombo to the Lake Tanganyika.

Senegal.—In former Addresses I have had occasion to record the great services rendered to Geography by the enlightened Governor of the French possessions on the Senegal, Colonel Faidherbe, who has greatly extended our knowledge of the country along the banks of that river. The most advanced post of the French is Medine, near the cataracts of Felou, 600 miles from the mouth, up to which point the river is navigable during the rainy months, for vessels drawing 12 feet of water. With a view to ascertaining the political condition of the countries beyond the eastern frontier, as also to fix accurately the geographical positions of places between the Upper Senegal and the Niger, an expedition was sent out by Colonel Faidherbe, in 1863, to traverse the distance between Medine and the important town of Segou, which had been visited by our own renowned traveller Mungo Park, sixty years previously. The mission was most ably and successfully carried out by Lieutenant E. Mage and Dr. Quatrin of the French navy. Countries recently desolated by semi-religious wars carried on by Mussulman chiefs were traversed with great danger, and the positions of the route carefully laid down, the road taken being a *détour* to the north, after crossing the Senegal, by Diangounté, to Yamina, on the Niger, and thence by canoe to Segou. By this journey Lieutenant Mage has filled up a void in all maps of the region of the Upper Senegal, and corrected the positions of many places as previously laid down by Mungo Park and others; but the accuracy of our English traveller in the most important points is cheerfully acknowledged by his accomplished French successor, especially, for instance, in the position of Yamina, which Mungo Park fixed at $13^{\circ} 15'$, and Lieutenant Mage found to be $14^{\circ} 17'$ N. lat. The expedition returned to the mouth of the Senegal in June, 1866, and the

French Geographical Society in the present year has rewarded the courageous leader with one of its gold medals.

ASIA.—Whilst, with the exception of the probable settlement of the north end of Lake Nyassa by the last journey of Livingston, little has been added in the past year to our stock of knowledge respecting Africa, much information has in the same period been elicited regarding the geography of Central Asia, particularly as respects the physical features of those vast northern portions of it which have been explored by the Russians, and the positions of places and mountain ranges laid down by our own surveyors to the north of British India.

At the head of the labours which have elucidated the comparative geography of this quarter of the globe, I place the two remarkable volumes produced by our distinguished associate Colonel Henry Yule, c.b., entitled '*Cathay and the Way Thither*,' published by our active auxiliaries the members of the Hakluyt Society, and of whose productions our Secretary Mr. Clements Markham is the perspicacious editor. Although the student of the former condition of China and the surrounding regions has ever dwelt with profit and delight on the descriptions of the great traveller Marco Polo, as first brought under the notice of modern English readers by Marsden, and as since rendered so popular by the excellent work of M. Pauthier, it was left for Colonel Yule vastly to extend our acquaintance with the amount of information possessed by our ancestors in the mediæval centuries which succeeded to the epoch when the great Venetian lived. By gathering together in one collection various records of other travellers in the East, commencing with those of the quaint and original Friar Odoric of Pordenone, in the fourteenth century, Colonel Yule has not only satisfied the cravings of scholars, but has at the same time gratified geographers by the preparation of a most instructive map of Asia, such as it was when explored by those earlier travellers, and when it was ruled over by the different branches of the family of Genghis Khan.

The contrast between the statistical and political condition of Asia, particularly its central portion, in those days when mercantile men traversed it freely from Azof or from Tabriz to India and China, and the present time, when there exists so small an amount of land intercourse with Europe is truly astonishing. In those days and even as late as the sixteenth century, Samarkand, a city renowned as a

seat of Mohammedan learning, was frequented by embassies including one from the King of Spain. Even our own Queen Elizabeth was so anxious in the first year of her reign to open out an intercourse by way of the Caspian with Persia and India, that she addressed a letter to "the Great Sophi, Emperor of the Medes and Persians." It was then (1558) that Jenkinson, our English traveller, made the journey from Astrachan to Bokhara, passing by Urgendj.

Now, with the exception of Russia, whose mission in 1841 has been noticed in previous addresses, no European power has had any sort of intercourse with the truculent Emir of Bokhara, to whom much of this fine region is, alas! subjected. It has since been left to stray travellers, one of the last of whom is the enterprising Hungarian Vambéry, to explain to the civilized world the real state of this region, once so important, and now so fallen through tyranny and misgovernment. No one can have read that author's sketch of the condition of the natives in either of the Khanates of Khiva or Bokhara without rejoicing that Russia has, through the energy of her Government, at last brought these barbarians to respect the frontiers of an empire which has established a safe line of communication between its own territories and those of China.

One of the most important statistical results of modern geographical research, and the employment of natural means to a great end, is the bringing into real use, for the first time in history, the River Jaxartes of the ancients (now called the Syr Daria), and navigating it with steamers from its mouth on the Sea of Aral for many hundred miles into Turkistan and Kokand. By this great feat, and by the erection of forts Russia has established an entirely new and well-protected route between Europe and China, far to the north of that followed by travellers and merchants in the middle ages, which was from the south end of the Caspian.

England, holding as she does so high a maritime position among the nations, may reflect with satisfaction on her great eastern traffic with India and China, carried on by her own great road, the ocean; and, far from envying the recent opening out of this land and river route through Central Asia, she may be well pleased that her Northern allies should have a beneficial commercial traffic by caravans with those fertile regions of north-western China, with which, in fact, we never have had any intercourse, but with whom the Russians have traded for ages, though always until now with more or less impediment, due to the forays of the intermediate wild people, and particularly the Kokandians. The two great empires

of Russia and China seem, in fact, to be destined by nature to interchange commodities by land and river communications through Central Asia, and so long as the line of such commerce between them is separated, as it now is, from British India and its dependencies by mountains, sterile, and snowy regions, impassable by modern armies, there never can be the smallest ground of jealousy on the part of Britain.

On this head I was much gratified, at our very last meeting, in listening to the able memoir of Captain Sherard Osborn on the actual state of Chinese Tartary, an enormous region that has become, through the relaxation of the Chinese hold, "a man's land," and in hearing from the eloquent author, as well as from the commentators on his Memoir, that, instead of any apprehension being entertained regarding the late Russian advances, it was generally felt that it would be greatly to the advantage of the natives, as well as to British power in India, that the influence of a civilized Christian nation should be extended eastward over a region now becoming desolate through misgovernment and lawlessness.*

These considerations led me naturally to say a few words upon the geographical operations of our medallist Admiral Boutakoff, which have mainly led to the establishment of the new Russian line of eastern traffic, and which have justly obtained for him a high reputation. The first of these enterprises might almost be dated the geographical discovery of the Aral Sea. For, although this great mass of salt water had been known to Aral tan geographers during several centuries under the name of the Sea of Khwarezm, though its shores had been visited by travellers, one of whom was the accomplished Russian geographer George von Meyendorff, who described the mouth of the Syr Daria or Jaxartes, at its north-eastern extremity, and another, General Berg† who led a Russian expedition along its western banks in the winter of 1825-6, no ship had ever sailed upon this inland sea. The first vessel launched upon it was constructed at Orenburg in 1848, and transported in pieces across the desert, and in it Boutakoff, after two years of navigation,

* The reader who wishes to become acquainted with the physical features and boundaries of the districts of Chinese Tartary, so well expounded by Capt. Osborn above, and of which he prepared a large map, must consult Keith Johnston's Library Map of Asia published by Mr. Stanford, in the preparation of which Mr. Trevelyan Saunders took a leading part.

† See the first published notice of the remarkable expedition of General Berg in 1825, in the work of myself and coadjutors, "Russia and the Ural Mountains," vol. i. p. 210. General Berg is now Count de Berg, and the Emperor's representative in Russian Poland.

defined the real shape of the coast, established the depths of the sea, and was the discoverer of the large island in it, the wild antelopes of which came to stare with astonishment, yet without fear, at their first invaders.

Fifteen years have elapsed since I communicated the first important paper of Bontakoff to this Society, and it was spoken of with all the praise it merited in my Anniversary Address of the year 1853.* The successful exploration of the Jaxartes, and the discovery of its fitness for steam navigation, which was the next exploit of Bontakoff, led to the establishment of the great central route to China already mentioned, and Russia naturally availed herself of the commercial advantages thus presented in these natural features near the boundaries of her Asiatic possessions.

The question now arises, whether, by these enterprises, the honour does not truly belong to Russia of having, for the first time in history, defined the course of the Syr Daria and its exit into the Sea of Aral? The classical writers were, as I shall presently show, ignorant of the true geography of this region, particularly of its northern part, and an attentive consideration of its geological structure and physical outlines has led me, followed by the inquiries I have made among comparative geographers who have well studied the subject, to believe that their silence with respect to the Aral Sea is no proof that it has not existed during the whole of the historical era.

Holding this opinion, I necessarily differ from my friend Sir H. Rawlinson, who, in observations recently delivered from the chair of this Society † made a very ingenious statement, and gave it as his opinion that there was sufficient evidence to show that in early times, say from 800 years before the Christian era to 500 or 600 years after it, both the river Oxus and Jaxartes flowed into the Caspian, the Aral being non-existent. That afterwards, and up to the year 1200, they fell into the Aral, and that for the next two hundred years (1200 to 1500) they came back into the Caspian, subsequently flowing gradually back into the Aral and forming the Sea as we now know it.

Although I know that my colleague will admit that my geological data must have some weight, I have to claim his indulgence for venturing to question the views of so eminent a scholar respect-

* 'Journal,' vol. xviii., President's Address, p. cxxvi.

† See 'Proceedings,' 11th March, 1867.

ing the changes of physical features in this region that may have happened in the days of history. Supported, however, as I am by the opinions of men on whose knowledge I place great reliance, I must say that I cannot regard the Persian manuscript, which was presented to Sir Henry by a clever chief of Herat, to be a document of sufficient value to override the conclusions at which I have arrived on many independent grounds.

Concerning the ancient course of the Oxus, I see no reason to differ from the Persian writer and Sir Henry. But when it is stated that in the year A.D. 1417 the Jaxartes had deviated from its former course, and instead of flowing into the Caspian (as the ancients had it), joined the Oxus, and thus, the two rivers occupying one and the same bed, came into that sea, I must withhold my assent. This is a novel and striking statement, and before we attach credence to it we must have some physical evidence to sustain it. In my state of scepticism regarding the value of this Persian manuscript, now for the first time produced, that which strikes me *a priori* as a sign of its invalidity, is, that when this region was open to knowledge through the long-enduring reign of the civilised and literary Arabians (say from the 7th to the 13th century), the Aral was known and laid down as a distinct water-basin under the name of Sea of Khwarezm. On the other hand, when after that period knowledge became dim and local, and civilisation was at its lowest ebb, then it was that the Aral disappeared. My conclusion from this coincidence of the supposed emptying of the Aral, with the absence of records respecting it, would be that the sea had existed during all that time, but that there were then no geographers to record the fact.

In treating this subject, let us first consider the separation of the Aral from the Caspian as originally dependent on geological changes of the surface, and then proceed to estimate the value we are to attach to the writings of the classical authorities in reference to a region so very imperfectly known to them. As a geologist who has studied this Aralo-Caspian question *in situ* I beg to place on record in our Geographical volumes my view of the prehistoric physical outlines of a region which, with the exception of the obliteration of one mouth of the Oxus, has, I venture to think, undergone no essential change during the human period.

According to all good authorities, including Humboldt, there existed in the latest tertiary, or what some call quaternary times, a vast depression on the surface of the globe, extending over 8,000

square marine leagues, in which a great inland sea was accumulated, and which, in a work on Russia, my associates and myself first mapped out under Humboldt's name of Aralo-Caspian.* In that sea there lived an abundance of molluscons and other animals, all of species having a local and limited range, and all strikingly distinguished from the more numerous animals of oceanic seas. Now, owing to the upheaval of large portions of the bottom of that old inland sea, its animal contents formed, in a fossil state, the Steppe limestone, as seen at different levels over an enormous area. Owing to these prehistoric movements of the crust of the earth, these fossil remains are seen to occupy the strata on the banks of the lake of Aral, as well as on the shores of the Caspian Sea. They also occur at various places and at different heights in the adjacent Steppe, extending westward to the country of the Don Cossacks to the north of the Sea of Azof, where I have myself examined them. There is therefore no doubt that, in prehistoric times, the Aral and the Caspian, and also portions of a much wider region, now raised above them, were occupied by one vast internal and depressed sea, large portions of which have been denuded. By these movements of elevation that part of the former great sea which became the Aral was elevated to about 115 ft. above the former western part, or present Caspian, and the seas thus insulated were separated through the same movements by the elevated plateau now called Ust-Urt.

This was the physical condition of the region long before tradition or history. Humboldt has well remarked that the great Aralo-Caspian depression had a similar origin to the much deeper cavity in the earth's surface occupied by the Dead Sea, though the one is only 80 feet and the other nearly 1500 feet beneath the Ocean. Now, if we endeavour to account theoretically for the low present level of the old Aralo-Caspian Sea by evaporation only, we are met by the facts that large portions of its former bottom have been raised to different altitudes in the surrounding region, and that the levels of the Sea of Aral and the Caspian are also different, and are separated by the great plateau of Ust-Urt. As it is impossible to explain the existence of the much deeper cavity of the Dead Sea except by a greater sinking of the earth's crust, so is such a phenomenon precisely what geologists would expect to see realized

* See *Russia in Europe and the Ural Mountains*, vol. I, pp. 313-314, and particularly observe the map and section, p. 314, from the Sea of Azof across the Caspian and the Ust-Urt to the Sea of Aral.

is a natural and compensating result of the corresponding upheaval of the adjacent lofty mountains of Asia.

This being the conclusion at which geologists have arrived, let us see if it be interfered with by any reliable historical records. As to the knowledge possessed by Alexander, or his contemporaries, it really does not touch the question of the relative courses of the Oxus and Jaxartes towards their mouths. For Alexander crossed the Oxus at about 400 miles above its mouth, and the most western point at which the great conqueror reached the Jaxartes was Cyropolis, where he passed it to defeat the Scythians; and that spot is about equidistant from the Aral Sea. Consequently, neither Alexander nor his generals could know anything of the real course of either river for great distances above their mouths. Scholars and comparative geographers doubt, indeed, if any weight can be attached to the unanimous statement of the Greeks, that both the Oxus and Jaxartes flowed into the Caspian, by mouths some 300 miles apart,* when they see how equally unanimous were the writers who came between Herodotus and Ptolemy in believing the Caspian to be but a gulf of the Northern Ocean! Again, we see how persistently the followers of Alexander confounded the Jaxartes itself with the Tanais, and fancied that they had doubled back upon the rear of Europe.

"The expedition of Alexander," says Humboldt, "far from extending or rectifying the geography of the Caspian Sea, confounded the Tanais with the Jaxartes, and the Caucasus with the Paropamisus or Hindu Kush."† Again, "It is through a singular combination of circumstances that the great Macedonian expedition, which in other respects extended the geographical horizon of the Western nations, became fatal to the geography of the Caspian Sea."‡ Further on, he says, "Some traces of the Sea of Aral, described as a great basin to the east of the Ural or Jaik River, are indeed found in Menander, the Byzantine historiographer, but it is only with the series of Arabian geographers, at the head of whom, in the tenth century, we must place El-Isackry, that we first obtain a certain knowledge of the topography of these countries."§

The truth is, that, when it was thus loosely said, that both the Oxus and Jaxartes flowed into the Caspian, we must make due allowance for the ignorance of the ancients of the northern portion

* 3400 stadia according to Eratosthenes, and 80 parasangs according to Ptolemy, both quoted by Strabo.

† 'Asie Centrale,' vol. ii. p. 14.

‡ Ibid., p. 163.

§ Ibid., p. 146.

of this vast region, particularly of the course of the Jaxartes, which no one of them had fully explored, and at the mouth of which none of them had arrived.

If, indeed, we rely on the sagacious Rennell, he, in his great work on the 'Geographical System of Herodotus,' may be said to have established this point, for, in speaking of the old geographers, he says, "they understood the *Arul* to be included in the *Caspian*, since they knew but of one expanse of water in that quarter; for the *Cyrus* and *Amoxos*, *Oxus* and *Jaxartes*, were all supposed to fall into the same sea." Thus he contrasts with the accurate subsequent knowledge of the Arabian geographers. And truly so, for this was the regular progress of observation, and a great advance over the ignorance of the classical writers respecting these hyperborean tracts. In those times the regions inhabited by the *Massagetae* and the *King of Khwarezmia* (the present *Khiva*) were barbarous countries, never explored by geographers; and, consequently, the classical authorities could only have obtained the little knowledge they possessed from native hearsay.

In his able essay on the 'Life of Alexander the Great,' *Wilhams* distinctly lays down, in his map of that period, the seas of the *Arul* and *Caspian* as distinct bodies of water. The same separation is given by *Rennell*, in his map of the twenty satrapies of *Darius Hystaspes*; and, whilst in it he indicates the *Oxus* flowing into the *Caspian*, and the *Jaxartes* into the *Arul*, he shows completely how the two seas were separated by what he terms the high plateau of *Samob*, the *Ust Art* of the present day.

Again, *Thirlwall*, in his 'History of Greece,' plainly leads us to believe that the Greeks could have known nothing of the region of the Sea of *Arul* and the mouth of the *Jaxartes*, except what they derived from the reports of the *King of Khwarezmia*, who came from a distance in the north to visit *Alexander*. In short, there is no historical evidence whatever to oppose the view, that the outline and structure of the *Arul-Caspian* region, as now seen, was determined, as I have said, long anterior to the historical era.

On the point of the prehistoric separation of the *Arul* from the *Caspian*, I entirely concur with *Humboldt*. "If we ascend," he says, "to the primitive condition of the vast Mediterranean concavity, I should be led to believe that, notwithstanding the diminution of surface which the *Caspian* and *Arul* basins may have undergone in the, historical times, from *Heceus* and *Herodotus* down to the tenth century of our era—i. e. to the days of

the Arab geographers El-Ishtakry and Ebn Haukal the event of the separation of the Aral and Caspian remnants to a geological epoch, which, like the separation of the Euxine and the Caspian, or the opening out of the Bosphorus and the Straits of Gibralter, are all ante-historical, or far beyond any human tradition.*

In sustaining this view it is to be remarked that, whilst the Aral Sea trends from north to south, the Syr Daria and its embouchure the Kuvan Daria, which flow into it from the east, have not courses at right angles to that sea itself; thus favouring the geological view that the great movement which produced the plateau of the Ust-Urt, separated the Sea of Aral from the Caspian, and left the chasm occupied by the Aral, was also accompanied (as is usual in such elevations, by transverse flanking openings in the mainland, on the east, along which those rivers flowed. In this view the parallelism of the Syr Daria to that of the Kuvan Daria, about 50 miles south of it, is remarkable.

If the Jaxartes ever flowed to the south-west, as suggested by Sir H. Rawlinson, it must have joined the Oxus long before the united streams fell into the Caspian, which is very distant from the nearest point of the valley of the Oxus. But if such an union of the great streams ever existed in so southern a latitude, it must have been perfectly well known to the ancients, and they have made no allusion to it. On the contrary, they believed and have stated, that the rivers fell independently into the Caspian, and by different courses, separated from each other by a wide interval.

Whilst I think that, probably, the many-mouthed Oxus always sent a large portion of its waters into the Aral I also quite believe that one of the branches debouched formerly into the Caspian, as explained by Humboldt, and as proved indeed by the old English traveller Jenkinson, to whom he refers. It will also be presently seen that the distinguished Asiatic geographer Seidenf. would explain the desiccation of the former or Caspian branch of the Oxus in another manner. The stoppage of that watercourse (formerly an usual line of traffic) may also be accounted for by a local elevation of land in that latitude, for it is not remote from the scene of igneous eruptions that produced volcanic mountains, as the greater and lesser Balkan near the ancient desiccated mouth of the Oxus. Such a change of level may, indeed, have been caused by the same subterranean

* Humboldt, '*Asie Centrale*,' vol. ii. p. 146.

forces which, in this latitude, evolve at the present day, the fires of Baku, and have recently thrown up volcanic mud-islands near the southern end of the Caspian. The elevating effect of these forces would deflect the Caspian branch of the Oxus and cause its waters to unite with the branches which flowed northwards into the Aral Sea.

The great distinction between the views taken by Sir Henry Rawlinson and myself is, that whilst I believe the main outlines of the Aralo-Caspian region were determined by movements of the earth in quaternary or later tertiary times, he refers the great changes which he believes to have been made in the courses of the Oxus and Jaxartes to no very distant historical dates; thus referring the emptying and refilling of the deep hollow in which the Aral Sea lies to comparatively modern times.

He offers, indeed, one argument, which if sustained, would at once disprove my view. In support of the opinion that the Aral Sea was non-existent in the thirteenth and fourteenth centuries, he states that in those days travellers from Europe to Asia passed over dry lands since occupied by that sea. If this were substantiated, the belief I have adopted that the separation of the Aral from the Caspian, and the upheaval of the broad intervening plateau of the *Tar-Tar*, would be at once removed from a pre-historic period to the days of Henry III. and the two first Edwards of English history.

Now, surely if so great a terrestrial change of surface as this had happened in the thirteenth or fourteenth centuries, the rumour of it would have been bruited throughout Europe and Asia. Unwilling however, to rest upon any notions of my own, I have consulted that admirable comparative geographer Colonel Yule, as to the routes taken by the mediæval travellers of that date; and he having favoured me with much information respecting the whole of this subject, I extract from his letter the appended long note.* By reference to it the reader will see that no foundation for such an assertion is to be traced in the narratives of these old travellers. For even when the starting point of their journey eastward lay upon the Volga, their line of march is traced either quite to the south of the Aral through the lands of modern Khiva, or more to the north of that sea and probably beyond right even of its shores.

* After alluding to the little weight to be attached to the statements of the Greeks, having examined the accounts of Herodotus and his followers, and rejecting the *Cassius* *Palæstina* of the ancients, which had been made obsolete, as he says, by the discovery of more respectable maps, the author proceeds to say—

"We see an utter ground in the narrative of the Embassy of Zoroastrian to the Khan of

augmented the volume of the Oxus, thus enabling it to supply a branch to the Caspian by the Gulf of Karabogas, and that to the failure of this supply we may attribute the drying up of the branch, without involving any great physical change of outline of the land. In this case the Aral Sea, occupying a separate cavity not communicating with the larger depression, would, as he thinks, become shallower, and to a great extent obscured by reeds, so as to have remained unknown to travellers for 500 years before and 500 years after Christ. M. Semenof suggests that in those days when the South-western branch of the Oxus existed, travellers proceeding northwards and meeting with little but reeds and mudflats, might very well suppose that the Aral was merely an extension of the great Bay of Karabogas of the Caspian Sea. In illustration of this view he informs me that the inhabitants around the lakes Ala Kul, and Saaryk Kul have at this day no precise conception of their separation, and term them both Ala Kul simply, because they are unacquainted with the marshy and inaccessible isthmus between them. In Central Asia, too, the River Tchu, through its desiccation, has lost its former communication with the Lake Issyk-Kul, but as in the Aral-Caspian region the Sary-an River has failed to reach the Syr Daria, and this lost river, having lost its northern affluents, could no longer contribute (if ever it did) by any of its branches to the Oxus, and has found an easier embouchure in the Aral. How easily these changes of direction are effected in the course of rivers in flat and sandy countries, is well known to many Russian geographers who have explored Central Asia.

Thus the Oxus, deprived of many of its former affluents, ceased to be able to throw any portion of its waters into the Caspian, and took the straight course into the Aral. This natural operation, as Semenof observes, may have also been accomplished within the historical period, and so, since its South-western or Caspian branch dried up, the Oxus, by throwing all, instead of a part, of its waters into the Aral, has given to that sea a better-marked place in human knowledge than it had in the fourteenth and fifteenth centuries.

Before I quit the subject of the now desiccated former branch of the Oxus, I may state, on the authority of my correspondent, General Melnikoff, that recently a memoir was presented to the Imperial Geographical Society of St. Petersburg, suggesting that men of science should be sent to the spot to examine into the evidences of that ancient head of the river, and also to test, by soundings along the shore of the Caspian, if any remains of the

old delta of that stream could be detected. But the project, as well as the continuation of the survey and soundings of the southern edges of the Caspian have both been suspended, I believe from motives of economy. The latter important work was under the able direction of Captains Ivanchizew and Oubsky, who had already proceeded so far that in less than three years they would have completed the survey of the whole of that vast interior sea; and it is indeed much to be regretted that a work of such great geographical interest should have been thus set aside.

In conclusion, my belief is:—1. That the Caspian and Aral have existed as separate seas before and during all the historic period. 2. That the main course of the Rivers Jaxartes and Oxus, as also of the sites of the Caspian and Aral seas, were determined in a prehistoric period. 3. That at one time the Oxus emptied itself both into the Caspian and the Aral, and that the Caspian branch stream was sent back to the course of the other portion of the stream, either by the local rise of some lands between Khiva and the Caspian, or by desiccation and a want of sufficient power of water. And, lastly, that the Jaxartes never was deflected from its natural east to west course to pass southwards, and so reach the Caspian by the southern end of the great elevation of the Ust-Urt, after a very long course at right angles to its present direction, to say nothing of its having in that case necessarily united with the Oxus by the way—a fact, of which, as already stated, all history is silent.

If old authors believed, without personal observation, that the Jaxartes, as well as the Oxus, fell independently into what they called the Caspian, we may easily account for such a notion at a time when the true meridian of barbarous places lying to the north of any line of intercourse between Greece or Rome and Asia was wholly undetermined. May we not rationally infer that the ancient geographers believed that the Jaxartes, as well as the Oxus, flowed into the Caspian, simply, as suggested by Rennell, from having heard that the Jaxartes terminated in one great sea, and that they naturally believed that the Aral was then simply the north-eastern portion of these large inland waters of which they had heard, but of which they knew nothing accurately.

In truth, when we know that the geography of the Greeks, and even of the Romans, was worthless, in regard to any lands beyond the parallel of the mouth of the Oxus, we necessarily recur to the works of the earliest Arabian geographers, in which the Sea of Khwarezm was first exhibited as a separate sea. As such it also appears in

the maps of Reidell, of Williams, of Yale, and, in short, of all the best authorities representing that which I believe to have been the true physical condition of the region during all historical time, and which I maintain dated from an ante-historical period.

In estimating the present or future relative importance of the Oxus and Jaxartes as lines of commercial traffic with China and India, I have no hesitation in saying that the latter river holds the first place. By reference to the memoir of Lieut. Wood, in the tenth volume of our 'Journal', describing the sources of the Oxus, and still better by inspecting the map of the Belor Mountains and Upper Sources of the Oxus, which has just appeared in our present volume (vol. 56), I agree with the able Russian geographer Venukof, who, after alluding to the wild barbarian races which occupy the high tableland of Pamir and the adjacent mountains, adds this significant passage: "When we, moreover, remember that this basin of the sources of the Oxus is closed in on the north, east, and south by mountains from 15,000 to 18,000 feet high, and across which the roads for pack-animals are few and difficult to traverse, we must arrive at the conclusion, that all ideas of converting this region into a rich entrepôt for a trade with India and China must be abandoned."*

Before I quit the subject of the investigation of Central Asia, let me ask those of my countrymen who read German with facility, to peruse the great work of Ritter, the '*Erdkunde von Asien*,' and they will at once learn how to value the vast amount of modern discovery which is due to our Russian contemporaries.

On former occasions I have naturally adverted to several of these remarkable researches, but I regret that, in my last two Addresses, I have omitted to notice, as I now do with special approbation, the memoir of M. Semenov, published in our Thirty-fifth Volume on '*Djagaria and the Celestial Mountains*.' As the only man of modern times who has explored a considerable portion of the Thian-Shan or Celestial Range, M. Semenov must be placed among the most distinguished of the famous band of Russian explorers—not simply for having determined many geographical positions, the forms of the land and their altitudes, but also for his careful examination of the natural character of the rocks which constitute the loftiest masses of those regions. In so doing he has set aside one of the few errors which the illustrious Humboldt fell into in his grand generalizations, when he was led to believe that the Thian-Shan—

* *Journal*, vol. xxxvi. p. 263.

the great axial range of Central Asia—must be essentially one of volcanic eruption.

Influenced, doubtless, by his successful description of the Andes of South America, and the rise to their summits of active volcanoes, the great traveller was very naturally disposed to apply the same inference to the lofty chains of Central Asia: the more so as all the imperfect data he could collect seemed to indicate the existence of rocks of that class.

But as soon as the Thian-Shan was examined by the only man of science in our age who has visited it, he found nothing but sedimentary strata: and as this important rectification is due to M. Semenov alone, we must not only accord to him all due praise as a geographer, but it is specially my duty as a geologist to thank him for making this great observation.

In fact, the grand movements of upheaval, which determined the form of many of the loftiest mountains, whether in Central Asia or in the great northern barrier of India, the Himalayas, were caused by former expansions from the interior, doubtless due to central heat, which raised up sea-bottoms, often altering them into crystallised rocks, and elevating them to enormous altitudes, without exhibiting any true igneous rocks.

Having already twice alluded to the recent discoveries in Asia by the Russians, and we having endeavoured to do honour to them by the award of our Founder's Medal to one of the most distinguished Russian explorers, it is now my pleasing duty to advert to others of their recent labours in that quarter of the globe.

On former occasions I have dwelt upon the explorations of Eastern Siberia and the affluents of the grand River Amur and the mountains to the north. Let us now turn to Central Asia proper, and see what good documents have been furnished by the different men of science who have explored those regions. I gather from the bulletins of the Imperial Geographical Society that the communications of MM. Semenov, Severtzof, Poitaruzky, Abramof, Bakkef, Golubef, and Prinz, explain the physical conformation of tracts and the natural riches of regions never before reached in modern times.

Of most of these hitherto unknown and wild tracts the Russian explorers have prepared or are preparing maps. To facilitate journeys from Siberia to Peking, Dr. Bretschneider, the physician to the Russian mission in China, has laid down upon a map all the different known roads across Mongolia, of which that which

is called the post road is 1700 *versets* long, between Kiarhita and Peking, with 68 relays. If the telegraph, which one of our countrymen, Mr. Gordon, who had travelled across this desert, sought to realize, be established, the journey across the desert of Gobi will soon be thought nothing of.

As to Bokhara, of which Englishmen have only painful recollections, on account of the murder of our distinguished officers, Conolly and Stoddart, we now know that two Russians MM Glinkovsky and Tatarinof, who were for seven months captives there, have added much knowledge to that acquired by their accomplished countrymen Khanikoff and Lehmann in 1842.

Those of our associates who may now visit St. Petersburg may see pictorial views of Khodjend, Tashkend, and all the places taken from the Kokandans in the recent advance of the Russians along the Syr Daria, and now forming parts of the great new province of Turkestan. I learn also, in reference to this region, so recently opened out to the civilized world, that M. Struve, the son of the great Russian astronomer, has prepared a map of the whole province of Turkestan, on a scale of 40 *versets* to the inch.

Deeply interested as we must all be in this grand opening out to geographers of a vast unknown country, my first request to my eminent friend Admiral Count Lutke must be, that as President of the Imperial Geographical Society and also of the Imperial Academy, he will procure for our Society copies of the maps which, to their great credit, the Russian geographers have prepared.

Northern Frontiers of British India.—At our last anniversary it was my duty to dwell upon the great accession to geographical knowledge obtained by the survey of Captain Montgomerie in the mountainous region north of Cashmir and the Himalayas Proper. I have now to remind you of the highly interesting journey made by Mr. W. H. Johnson, from Leh, in Ladakh, to Delhi, in Chinese Turkestan, a city which had not been reached in this century by any European since the days of Marco Polo and the Medieval travellers, except by Adolf Schlegelintweit, who was killed. This town lies further northward than any point reached by his brothers when they traversed the Kuen Lun.

The clear and eloquent manner in which this great feat on the part of an Indian engineer, brought up under Sir Andrew Waugh, was laid before the Society by Sir Henry Rawlinson renders all comment on my part superfluous. For he not only delineated the

achievement of that traveller, but put you completely into possession of all the historical data relating to this vast and little-known region, the routes used in old times for traffic, and pointed out to you how it happened that Il-lu, once a great mart on the highway between Russia and China, had been left aside on account of the more favourable route by Yarkand. Although I have always discouraged discussions on the political interests of our own country in reference to those of other nations, I entirely agree with the observation which fell from Sir Henry Rawlinson, that both the Russians and ourselves might trade advantageously with that great intermediate region, and that at the chief cities of each, consuls of either nation might live together in perfect amity.

When that state of things shall have arrived our geographers would no longer be wanderers, stealthily seeking to acquire knowledge, but would be associated with Russian topographers in defining the physical features of wide tracts, which, though useful to both countries for trade, are far too vast to be objects of settlement for either.

The mineral products of this region are, no doubt, as numerous and important as Sir Henry Rawlinson described them to be, particularly in gold and jade, and the opening up of a fresh trade might be highly beneficial to ourselves and to Russia, now that the Chinese domination has been entirely set aside.

Net.—The survey of Lake Pangkong in Tibet, by that intelligent and active explorer, Captain Godwin Austen, is another fact of marked interest in the delineation of tracts lying to the north of the frontiers of British India. Passing from Loh over the Chang La Pass, 17,470 feet above the sea, this traveller, like Dr. Thomson in other adjacent tracts, encountered the most enormous accumulation of debris which had been swept down from the Snowy Mountains, occasionally barring up the streams. He followed the great lake to within a short distance of Noh, a Tibetan town of the province of Kudek. Although the Lake Pangkong has now an altitude of 15,551 feet above the sea-level, Captain Austen showed, judging from traces of remains of trees at considerable altitudes, that its waters must once have stood at a much higher level. At that remote period the waters were fresh and the country covered with rich vegetation, but now the waters of the lake are much too salt to nourish any mammalian animals, and its banks are entirely destitute of vegetation.

See for a New Indian Capital.—At one of our evening meetings in

January a valuable paper by the Honourable George Campbell a Judge of the newly-instituted Supreme Court of Judicature for the Bengal Provinces, was read and discussed. The subject was an enquiry into the most suitable site for a new capital for our Indian empire there being a pretty general agreement in the condemnation of the present metropolis. Had it been possible to foresee the present extent of our dominion, it is almost certain that Calcutta would not have been our choice. It is situated at a corner of our dominion, all the most valuable portions of it lying north, south, and west of it, sometimes at distances of 1000 or 1500 miles. It lies in the delta of a great river, almost on the Tropic. The result of this locality is that the climate is unsuited to the constitutions of the denizens of a cold and temperate region, one third part of the year only being congenial, while the remainder is divided between great heat and drought and great heat and moisture. In such a climate Europeans cannot labour out of doors without imminent peril to health and the consequence is that most Englishmen, from the Governor-General downwards, abandon Calcutta, if they can, for two thirds of the year. Still, as the port of the mighty Ganges, Calcutta is truly a metropolis. Although at first a village, it was the seat of our commercial factory; and Bengal, to which it belongs, was our first profitable acquisition—that acquisition, indeed, which, in the sequel, enabled us to make and maintain future territories.

The desirable points to be held in view in the selection of a second capital for India are, that the locality should be central that the climate should be so temperate that the ruling class should be able to labour effectively without detriment to health and that the locality should be secure from the dangers of foreign and domestic aggression. There are, no doubt, other qualities which it would be convenient to combine with these, but which are probably nowhere attainable. It would for example, be desirable that the capital should be situated in a fertile and productive territory, capable of sustaining a large population, but such a position could only be found in the low and hot valleys of the great rivers. It would perhaps be desirable that the seat of government should, at the same time, be a great commercial emporium; but this advantage cannot be combined with the more indispensable requisite of a temperate climate, since all the possible commercial emporia of India are tropical, and on the sea level. It would be desirable that the Government of India should have the benefit of a public opinion at its

seat, but this does not seem to be indispensable, for with the rapid communication which exists in our times, and which has been extended even to India, the public opinion of great provincial towns may be as effective as that of any capital.

Even centrality of position has, by the discovery of steam navigation, the railway, and the telegraph, become of far less importance than it once was. The same discoveries have contributed to diminish greatly the risks of domestic insurrection, and as to danger from a foreign enemy, our substantial protection is not local, but rests on England, and the pre-eminence of England's navy.

The author of the paper points out the neighbourhood of a town called Nasrick as the most suitable site for a new capital of India. Nasrick is an inconsiderable Mahratta town, and a famous place of Hindoo pilgrimage. It has a fertile territory, is but 120 miles from Bombay, and on the line of one of the great railways, but then it is two degrees within the Tropic, and but 2000 feet above the sea-level, so that its summer heat cannot but be very considerable. Nasrick did not receive the general approval of the able and experienced Indian officers* who discussed the question at our meeting. Some of the speakers expressed a favourable opinion of the Neilgherry Hills—a mountain range which covers an area of 600 square miles, and already the seat of several *saparas*, and which contains several extensive plateaux, which rise from 3000 to 7000 feet above the sea-level, with a reduction of temperature corresponding to these altitudes, and not unlike the of nature of an English summer, although lying between the 10th and 11th degrees of latitude.

Delta of the Indus.—In the course of the session a paper of eminent ability on the Physical Geography of the Lower Indus, was read by Colonel Tremenhore. It gave rise to a spirited discussion on a disputed question of engineering, but as engineering is not a special branch of geography, we, according to our usual practice, offered no opinion of our own. Exclusive of all theory, however, the subject of Colonel Tremenhore's communication, which includes in a direct line to the sea, 330 miles of the lower course of the Indus, and, incidentally, the harbour of Karachi, the only navigable entrance to the Indus is of unquestionable importance.

The Indus, with its harbour, Karachi, I may observe, is to Western India what the Ganges and Calcutta are in Eastern India.

* For the various opinions expressed by Sir Henry Rawlinson, Sir Charles Trevelyan, Sir Robert Montgomery, Sir Erskine Pelly, and others, see 'Proceedings,' vol. xi. p. 74.

No doubt the Indus and its affluent, passing as they do through a comparatively sterile and under-peopled region, are of far less value to agriculture than the Ganges with its affluent, which water the most extensive, fertile, and populous parts of India, yet it has its special advantages. For vessels of burden its navigable course is more extensive; it is our natural frontier at the only quarter from which our Indian dominion can be assailed, while it is the great highway to the possible points of attack. The port of Kurrachee has even some advantages over that of Calcutta. The navigable difficulties incurred in reaching it from the open sea extend only about 10 miles, while in the case of Calcutta they extend over 150. Kurrachee has, besides, the advantage of being from 2000 to 3000 miles nearer to England—the true source of our Indian wealth and power—than Calcutta. Kurrachee was, like Calcutta, a small village when we took possession of it only 24 years ago. It is now a considerable, well-built town, and its importance as a commercial emporium may be judged by the following simple fact. Its joint export and import trade in 1844 was of the value of 122,160*l.*, and on the average of the four years ending with 1860, it amounted to 3,500,000*l.*

Independent of the political and commercial advantages of the Indus, with its harbour, it is not to be forgotten that Kurrachee is the only port existing on the western side of India, with the exception of the fine one of Bombay. India, meaning by this the proper country of the Hindus, is, for a great, populous, and wealthy region, singularly deficient in good harbours. On its eastern side it has not one until we arrive at the head of the Bay of Bengal, where we find Calcutta, made tolerably safe, only by dint of great skill and heavy cost. It is worth notice, in a geographical sense, that the opposite coast of the same gulf forms, in this respect, a singular contrast, for here we have no fewer than four good and safe harbours, Negra, Rangoon, Martaban, and Mergui, the three first being also the embouchures of navigable rivers. If we include Penang, which is on the same coast, we have five harbours, while large and populous Hindustan has but three.

Aurichistan.—In the mountainous region immediately to the north of the plains of Mesopotamia, and around the sources of the Tigris and Euphrates, our Consul at Ispahan, Mr. F. E. Taylor, has been doing good work of late years in advancing geographical and archaeological knowledge. In a former session of our Society Mr. Taylor communicated to us the results of his researches during the

years 1861-3, when he explored the eastern head of the Tigris, verifying the description of Sinbo, and discovering near it a record of an invasion of the country by one of the Assyrian monarchs. Returning, in 1865, to the scene of his labours, after a short visit to England, this persevering explorer has continued his researches in the direction of the Kara Su River, or Lycus of the ancients. He has lately sent us a brief preliminary account of his last journey, stating that he has traced the river to its sources and discovered the site of Pompey's Neopolis. A more detailed account of these explorations, together with a map of his routes over districts never before visited by a European in modern times, is promised by Mr. Taylor, and will doubtless form the subject of discussion at one of our evening meetings early in the next session.

Egypt. The Great Pyramid.—Among recent publications, I must not omit to notice Professor Piazza Smyth's '*Life and Work at the Great Pyramid.*' If our Government of late years has seemed too often chargeable with indifference to the promotion of scientific research in foreign regions, and even in its own dominions, there are still private Englishmen ready to devote their time and means to such researches. And as it is to the labours and discoveries of one Englishman (Colonel Howard Vyse) that Europe owes all the most important discoveries regarding the general structure of the Great Pyramid, so now to the indefatigable work of another we owe the most minute and scientifically accurate measurement of its details that has ever been executed.

Before his visit to Egypt, Professor Smyth had become an enthusiastic advocate of the late John Taylor's theory of the Pyramid as a great metrologic record; and it was his desire to test and develop this theory by more accurate measurements that caused him to Egypt. His stay there has enabled him to produce a book of great interest, both in the narrative of his operations and in their results; and its connexion throughout with metrology, in the most comprehensive sense of the word, renders it a fit work for the consideration of the Geographical Society. Some of the measurements were performed under remarkable advantages, for Professor Smyth had the good fortune to see the whole four of the corner-stones of the Great Pyramid, as originally excavated in the living rock, uncovered simultaneously for the first time on record. Yet the important measurement between these four principal points was sorely obstructed by the masses of rubbish that

surround the pyramid, the removal of which is too costly for private means. Professor Smyth shows clearly that the Great Pyramid is not merely the greatest of a class, but stands *alone* in its proportions and constructive arrangements. He shows that though its entrance passages were so carefully sealed, the details of their elaborate structure clearly point to the anticipation of future disclosure, whilst marks indicating the way to such disclosure have even been discovered by Professor Smyth in the masonry of the first descending passage. He has gone far towards establishing beyond doubt the fact—which many still reject—that the pyramid was originally cased with smooth Mokattam limestone (not granite, as some have stated). His measurements demonstrate that the pyramid is (or rather has been) a true symmetrical figure on a square base, the orientation of the sides of which deviates from the truth not more than 5 minutes at most, whilst their *mutual* deviation does not exceed 33 seconds. They prove that the altitude of the pyramid is to the perimeter of its base in the ratio of the radius to the circumference of a circle—that the number of cubits in the length of the base symbolises to a fraction the length of the solar year; that the cubical capacity of the lower course of the King's chamber is just 50 times the interior content of the granite coffer which stands within it; whilst the exterior capacity of the coffer is just double its interior contents. These are only a very few samples of the results of the measurements in which Professor Smyth conceives that he finds the records of a metrologic system of the most scientific kind, of a standard of length based on the length of the earth's semi-axis of rotation, of standards of weight and capacity based on the earth's mean density and on the preceding standard of length, of time standards in the length of the year and the record of the Sabbath week; nay of a standard of thermometrical and a scale of angular measurement. Some of Professor Smyth's concluding speculations and deductions are, doubtless, a little eccentric, and the least questionable of his results are not unimaging. But whatever may be thought of the more startling parts of the book, as a whole it is the record of a great undertaking scientifically executed, and it will doubtless produce much discussion among antiquaries and astronomers as well as geographers.

SOUTH AMERICA.—In my Address for last year I fully discussed, with the valuable aid of Sir Woodbine Parish, the geographical

questions which were solved by the exploration of the river Purús by Mr. Chandless. That most accurate observer ascertained beyond a doubt that the main branch of the great stream, which he ascended nearly to its source did not extend to the mountain ranges of Peru. We have since received a full account of the second voyage of Mr. Chandless up the Purús, and of his exploration of its principal affluent the Aquiry, which he undertook in the season of 1865-6. He found no difficulty in navigating the Aquiry for the first 100 miles, even at the lowest stage of water, and considered it to be perfectly navigable for steamers up to the parallel of 11°s. Higher up it became wider and shallower, and his canoe was finally stopped by a network of stranded timber. After navigation became impossible, Mr. Chandless attempted to reach some river belonging to the Madre de Dios system, flowing from the Andes. He forced his way for a considerable distance through almost impenetrable forest but, at the end of a week, was obliged to return for want of provisions.

While Mr. Chandless was thus, by an exhaustive process solving, in the negative, the question whether the streams flowing from the Cordillera of Cuzco and Carabaya formed the river Purús, our Peruvian Honorary Corresponding Member, Don Antonio Raimondy, was furnishing us with information as to their true course. It appears, from our correspondent's narrative, that the enterprising Peruvian explorer Don Faustino Maldonado constructed a canoe in February, 1861, and embarked on the Madre de Dios with seven companions. He was drowned in passing a rapid, but his surviving comrades continued the voyage, entered the great river Madeira, and eventually reached Manaus on the Amazon, at the mouth of the Rio Negro. As the Beni is the only large river which flows into the Madeira on its left bank, it would appear that the rivers Madre de Dios and Ynambari, flowing from the Cordillera of Cuzco and Carabaya, and which were so long supposed to be the sources of the Purús, are in reality tributaries of the Beni. Señor Raimondy's own valuable labours have comprised a careful examination of two tributaries of the Ynambari, in the province of Carabaya; but it is his intention to continue the exploration of this interesting and very important region in future years.

It is with great satisfaction that I have to announce the departure, by the last Brazilian Mail Steamer, of that most indefatigable and accurate scientific explorer, Mr. Chandless, to the scene of his former labours and triumphs. It is his intention, on this occasion, to

ascend the rivers Madeira and Beni, and thus at length to reach those streams flowing down the forest-clad slopes of the glorious Eastern Andes, which he had previously sought in vain at the head-waters of the Purús and Aquiry. We shall look with much interest to the results of our Medallist's further explorations.

While on the subject of South America I may mention that the attention of the present energetic and enlightened ruler of Peru, Colonel Don Mariano Ignacio Prado, has been turned to the opening up of the great fluvial highways between the Peruvian provinces in the Andes and the main stream of the Amazons, chiefly by way of the Pach tea, a river which our Lieutenant (now Admiral) Smyth endeavoured to reach in his courageous exploration of the year 1841. Three steamers were employed last year in exploring the Ucayali and Tachitos, and succeeded in reaching Mayra 323 miles from Lima, on the 1st January, 1867, thus proving the Amazons to be navigable for 3623 miles, from its mouth to the eastern slopes of the Andes near Lima. The hitherto almost unknown River Javari has also been lately explored, to the extent of about 1000 miles, by a joint Peruvian and Brazilian boundary commission. This laudable activity, while developing the resources of these countries, cannot fail to extend geographical knowledge.

AUSTRALASIA.—In my last Address I recorded the progress of the Expedition in search of Leichhardt, which had been organised by a Committee of Ladies at Melbourne, incited by our learned and enthusiastic associate, Dr F. Mueller, and which had been munificently supported by grants from the Colonial Legislatures, besides donations from the Queen and our own Society. Since then the able leader of the expedition, Mr. Duncan McIntyre, much to the grief of the promoters, has fallen a victim to a malignant fever now prevalent along the banks of the streams which flow into the Gulf of Carpentaria.* Before this unfortunate event occurred, Mr. McIntyre had made good progress in searching for traces of the long-lost party, along the banks of the Albert, Gilbert, and Leichhardt rivers; questioning the natives and examining all the reports of white people living amongst the tribes. His journey across the continent, however, from the

* I am informed, by Sir George Bowen, Governor of Queensland, in a letter dated 10th December 1867, that the last accounts report an improvement of the public health in those districts.

River Darling to Burketown, on the Albert, has added but little to our geographical knowledge, the party having followed very nearly on the tracks of the former explorers, McKinlay and Landsborough. The death of Mr. McIntyre occurred on the 4th of June last; and I have lately learnt that Mr. W. F. Sloman, who succeeded to the command, has since also died. In this state of affairs, with the Expedition left to itself on the opposite side of the continent, the Ladies' Committee have entrusted its further management to Mr. Campbell, the uncle of the late leader, who has contracted to continue the search for the remainder of the two years originally contemplated, and has appointed Mr. W. F. Barnett as leader. By the last accounts from the Gulf of Carpentaria, dated December 21st, the party had resumed the search, and had obtained a valuable coadjutor in Dr. White; the camels were reported as in fine condition, and well suited for Australian travel.

In other parts of Australia the acquisitions to our geographical knowledge have been limited to local explorations in search of lands suitable for pasture or settlement. This has been especially the case with the colony of Western Australia, which has of late years added much to our information respecting the northern portions of its territory. Mr. R. J. Sholl has explored the neighbourhood of the Glenelg River and Camden Harbour, but without hopeful results as regards its capabilities for immediate settlement; and on his report the Provincial Government has abandoned the attempt to colonise the district. The settlement of the northern territory of South Australia has also proved a failure, and is now abandoned,—the survey of the neighbouring coasts and rivers undertaken by the Colony, with a view to discover suitable lands for colonisation, having borne no fruit. On the other hand, the progress of settlement in the tropical portions of Queensland, on the eastern coast, and at the head of the Gulf of Carpentaria, steadily continues. Another new township, named Carnarvon, has been formed in the Gulf, on Sweers' Island, to the north of the mouth of Albert River, where the harbour, named by Captain Flinders "Investigator Roads," is the only good one at the head of the Gulf. This is probably destined to become the principal seaport in this part of Australia, and the emporium for the settlements on the banks of rivers running into the Gulf. Upon the general subject of the advance of colonization in Queensland I entered into some detail in my last Address, and need not now recur to it, beyond calling your

attention to the able descriptive paper of Mr John Jardine,* which gives so much information regarding the neighbourhood of our new settlement of Somerset, at Cape York.

New Zealand.—Since the publication of the valuable papers of Dr. Haast and Dr Hector, on the glaciers and passes of the Canterbury and Otago Provinces, in the Middle Island, New Zealand, in the 34th volume of our Journal, the exploration of the rugged and almost impassable mountain range which forms the backbone of the island, has been continued by the former of these gentlemen. Owing to the discovery of gold on the western coast at Hokitika, the Provincial Government of Canterbury were anxious to discover some nearer route over the mountains than the circuitous one by the Hurunui and Tera-saka or Harper's Pass, and several parties were sent out to find, if possible, other passes. From this resulted the discovery of Arthur's Pass (3081 feet) near the head-water of the Waimakairi by Messrs. Arthur and George Dobson, and the north Rakai Pass (4045 feet) by Messrs. Browning and Griffiths, which latter reduced the distance between the east and west coasts by about eleven miles. On Dr. Haast devolved the duty of examining these different passes, and preparing a series of altitude sections by barometrical observations, to serve as a guide to the Government in choosing the best route. The task was accomplished in the latter part of the year 1865. Dr. Haast traversing the various passes, and, on his return to Christchurch, drawing up a series of admirable diagrams in illustration of the subject, copies of which, together with a descriptive paper, he has forwarded to me for presentation to our Society. The north Rakai Pass was found by Dr. Haast to be deeply covered with snow in the early summer, and he states that the routes by Arthur and Harper passes (although considerably longer) will always be preferred by travellers, as they are seldom obstructed by snow, and are not subject to avalanches.

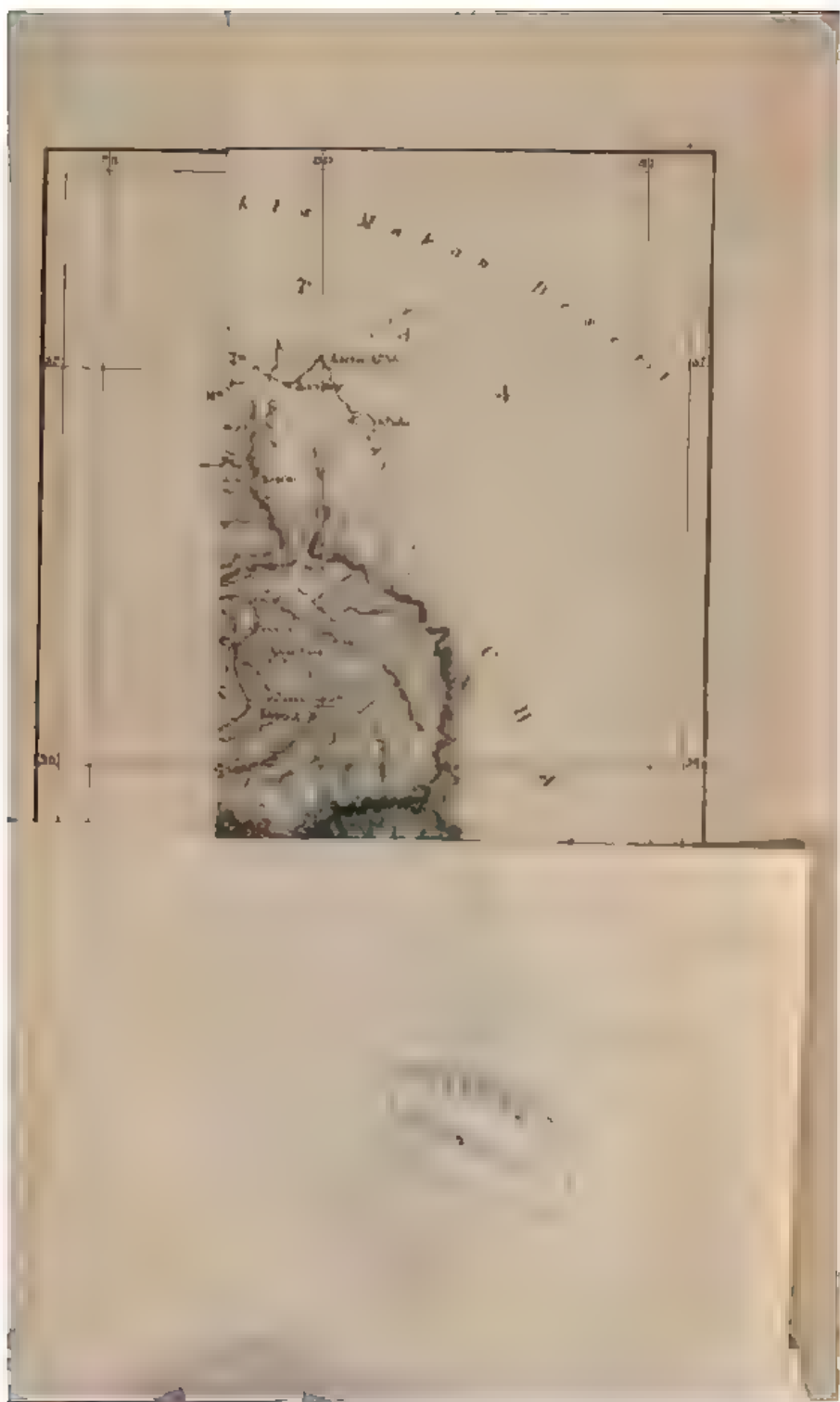
Conclusions.—In concluding this, the thirteenth, Address which I have delivered to you, I must now assure you that the Council ought to have selected some one younger than myself to occupy your chair. For in truth, my numerous avocations press so heavily upon me, that, with the heartiest desire to serve you, I am too well aware of my inability to efficiently perform all I could wish.

* See JOURNAL, vol. XXVII. p. 26

Permit me, however, to explain, that if this Address is not as complete as it ought to be, my chief apology is that, as our anniversary approached, I was in the throes of bringing out a new edition of the chief work of my life, 'Siluria.' But whilst Geology has been the pursuit on which I have established whatever little reputation I possess as a labourer in the fields of Science, I know that you will believe me when I say that I have so loved Geography that I have through life considered these two great branches of knowledge to be inseparably connected. At all events, during my term of office as your President, I have ever striven to the utmost of my power to preserve the efficiency and augment the influence of the Royal Geographical Society.

If, then, you should be pleased to adopt the recommendation of the Council, and re-elect me, I promise you that, if I be spared, I will put forth what energy remains in me to carry out your wishes during the ensuing year. But really, when that term shall have expired, I trust you will place at your head a younger chief; and whoever he may be, I am sure when he has been but a year in office he will declare, as I have ever done, that the Fellows of this Society are men of whose support he may well be proud, and over whom it is a true honour to preside.





PAPERS READ

BEFORE THE

ROYAL GEOGRAPHICAL SOCIETY

DURING THE SESSION 1866-67.

[FORMING VOL. XXXVII. OF THE SOCIETY'S JOURNAL.
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I.—*Report on his Journey to Ileké, the Capital of Khotan, in Chinese Tartary.* By Mr. Civil-Assistant W. H. JOHNSON, F.R.G.S., Great Trigonometrical Survey of India.

Read, November 12th, 1866.

A DETACHED party of the Kashmir Series of the Great Trigonometrical Survey, under my charge, left Delra Doon on the 27th May, proceeded *via* Simla and Rampur, and, on the 17th July, arrived at Leh, where I was obliged to halt the camp for a week to enable me to make the arrangements necessary for my further progress.

On leaving Leh I took the well-known route *via* Tikeo and Tankai to the Pangong Lake, and then crossed over the Masarik Pass, to the encircling ground of Pamchalan, in the valley of Changchémo. I then marched eastwards up the Changchémo Valley, halting at the celebrated hot springs known as Kiam, and again at Lünching; thence I marched northwards and crossed a pass called by my shikari the Lunkang Pass, over a range of hills, which, running from east to west, rises to a height of about 3000 feet above the Changchémo Valley, and forms its northern boundary. I then marched in a northerly direction on high extensive tablelands, which might be called plains in comparison with the rugged ranges of the Himalayas, for they have a greater extent of level than of hilly ground, and the hills are low and have such easy slopes, that a horse may be galloped over them everywhere. The first plain is about 17,000 feet above the sea-level; it bears traces of having been the bed of a large lake, and at present contains two lakes, which, when I saw them, covered areas of about 16 and 60 square miles respectively, and are probably much larger in April and May, on the melting of the snows. A second plain slopes for a

distance of 30 miles in a north-easterly direction from 16,700 feet down to 15,300, when it rises again towards the watershed of the Kiuu Lun. I traversed these two plains, and skirted a third lying to the north-west of the second. From the hills I ascended I noticed other plains of considerable extent to the east and south-east, which are believed to merge into the Changthang Plains of Rudok. On the other hand, to the west, there were no plains, but a series of deep valleys, which are the sources of one of the principal affluents of the Karakash River. I struck this river at a point 6 miles west of the G. T. Station on the Kiuu Lun, which is marked E 57 (lat. $35^{\circ} 55' 30''$, long. $77^{\circ} 28' 32''$, height 21,767). At this point the height of the river is 15,500 feet. Its sources are about 25 miles distant to the s.e., in a spur from the Kiuu Lun, which separates the valley of the Karakash from the second of the plains already noticed.

I may here state that I gathered from native information that the Kiuu Lun range stretches in an easterly direction for a distance of about 100 miles from the sources of the Karakash River, and then terminates on an extensive plain communicating with the Changthang Plain. I was informed that by skirting the Kiuu Lun range, wheelal conveyances might be easily taken from Heli to the Changchenno Valley near Leh; that water, grass, and wood, are obtainable at every halting-place, and that the only difficulty is the liability to meet with opposition from the shepherds of Rudok, in the portion of the route which passes across the Changthang Plain.

I ascended three peaks of the Kiuu Lun range, which had been previously fixed by the Trigonometrical operations of the Survey, and which, having no names, are known by us as E 57, E 58, and E 61. The contrast between the view to the north and that to the south was very striking; on the one side there was little but plains, on the other mountains and deep valleys. I might almost have fancied myself on one of the southern ranges of the Himalayas, with the plains of India to the south, and great mountain ranges to the north, excepting, that in consequence of the great altitude of the Kiuu Lun peaks, the mountains to the north were generally lower than those on which I was standing.

From these peaks, however, I could not get a view of any of the important towns of Khotan, which I was so anxious to see, and I should have been obliged to have been satisfied with the extent of exploration which I had already accomplished, had not an opening presented itself for me to proceed to Khotan, under the protection of the khán of that country.

While I was in Leh, a native of Central Asia presented me a

letter from the Khān Badshā of Khotan, inviting me to enter his territory, as he wished much to see me, he also stated that the khān, having heard the previous season of my being in the neighbourhood of his boundary, had sent men at that time to induce me to see him, but that I had left Suzai, and returned to Leh, before his messengers arrived at the former place.

The receipt of this letter, in which the Khān of Khotan agreed to render me every assistance, and to permit me to return to Leh, after a short stay in his capital Iktl, together with the personal statements of several merchants and traders of Leh and Yarkand, emboldened me to undertake the risk of visiting the Khotan country, thinking by this enterprise to be able to furnish information of value to our Government, as regards those provinces of Central Asia, which are at present almost unknown to Europeans, and also of the movements of the Russian forces in those parts of the world.

On arriving at the source of the Karakūsh River, I despatched the Khotan messenger, whom I had brought away with me from Leh, with a letter to Hahleghā, Khān of Khotan, proposing that I would visit him, provided he sent either of his two sons, or his wazeer, to receive me at the first village on the northern side of the Kūn Lun range of mountains.

While waiting at the Karakūsh for a reply to my letter, I employed myself in visiting several peaks, in order to fix sufficient points on the plane table for extending the work across the Kūn Lun range, and in taking observations for determining the rate of my watch.

The bearer of my letter returned on the twentieth day after his departure, accompanied by a beg, or governor of a small province, and an interpreter, with a letter from the khān, pressing me earnestly to visit him, with promises to take every care of me while I continued in his territory, and informing me that he had despatched his wazeer, Saifullā Khōjā, to meet me at Brinjā, the first encampment beyond the Ladak boundary, for the purpose of escorting me thence to Iktl.

On the 6th September I started from my encampment at the Karakūsh towards Brinjā, which I reached in four days, and found the wazeer awaiting my arrival. It took me 16 days in all to march from the Karakūsh to Iktl. The road was very difficult, and the pass by which I crossed the Kūn Lun was said to have been only very recently discovered by Jumā Khān, the Khotan ambassador to the British Government, who was compelled to find his way over this part of the range because the regular road from Iktl to Leh, *via* Sanju and the Karakoram Pass, was in the hands of the Yarkandees, who were then at war

with the people of Khotan. I have described this route in full in Route No. I, accompanying this report.

On my arrival at Brangga I was received by the wazeer Sai allá Khogá, and further on at the town of Urangkásh, which is three miles from Ichi, by the Khán's two sons, escorted by cavalry and infantry, and was accompanied by them to the capital, where I was very comfortably housed in the old Chinese fort. I had interviews with the Khán of Khotan and his two sons almost every day of my stay in the place.

The Khán Badsháh of Khotan is about eighty years of age, of good stature and appearance, and about 6 feet in height; rather stout, but well-built, and of a very fair complexion. He is seen to great advantage when dressed in his robes of state, which consist of a shaga of silk, worked over with gold thread, and a large white puggie (turban) tied after the Mogul style. He is reported to be very ill-tempered, and very strict in his government. I must, however, admit that he showed me much kindness while in his country, and kept all his promises, with the exception of not allowing me to leave the place, after a stay of four days, as had been agreed upon; and in wishing to keep me with him altogether,—which he would have done, had I not pointed out to him the uselessness of his designs. He wished to detain me as a hostage, until such time as the British Government sent him assistance, in the shape of troops and arms, against the Khokínees, or Ardajanees, and the Russian forces, which latter are daily approaching towards Yarkand and Khotan. The Khán of Khotan mentioned to me that he and his second son traveled through India, *via* Peshawar, Meerdan, and Bombay, to Mecca, in 1861, and returned to Khotan in the early part of 1863, passing through Persia, Turkestan, and Khokan, and penetrating for some distance into Russian territory. On his return he was made the chief kazi of Ichi, and within a month he succeeded in raising a rebellion against the Chinese, which resulted in their massacre, and his election by the inhabitants of the country to be their Khán Badsháh, or ruler. The province of Khotan was the first in which the Chinese were destroyed, and the example was followed in Yarkand, Aksu, and other cities. As the result of his own observations, and the experience he has derived from his travels, the Khán also informed me that he found the inhabitants of India enjoying greater advantages as regards justice, liberty, and freedom from oppression, than any other country. The Russian principles of Government he said were oppressive, particularly the conscription, which forced men to serve in distant parts of the empire, far away from, and with but little

chance of revisiting their homes. The Khokándes also dread the country of Sibir (Siberia), which they are aware is the penal settlement of the Russian Government.

Khotan, which was formerly a province of China, is now independent,—the Mohammedan population of Yarkand, Khotan, Kashgár, and other provinces of Central Asia, having, in 1863, massacred all the Chinese in those parts, save a few who adopt the Mohammedan religion.

The whole country of Khotan north of the Kúm Lun range, including seven parganás of Yarkand which had submitted to the Khan during my stay in Ichi, is an immense plain, sloping gently downwards to Aksú, which place is fifty or sixty miles north of Ichi. This entire plain is watered by numerous small streams and some large rivers, which are the principal affluents of the Tarim or Argol River, which, in its turn assembles into the great lake called Lob Nur. The whole country is irrigated by canals from these rivers.

At a distance of six miles to the north east of Ichi is the great desert of Taklá Makan (Gobi) which, with its shifting sands that move along in vast billows overpowering everything, is said to have buried 300 cities in the space of 24 hours. The edge of this desert has the appearance of a low range of broken hills, and consists of hillocks of moving sand, varying in height from 200 to 400 feet. Ten, of which I have brought away a sample, was dug out of one of these entombed cities while I was at Ichi, and was believed by the natives to be of great age. Gold coins,* weighing 1 lbs., and other articles, are also reported to have been found in some of them, but the positions of these cities are only known to a few persons, who keep it a secret in order to enrich themselves. The only one that is well known is that in which very large quantities of black tea are found, and which commands a ready sale in the markets, now that all trade with China is stopped. The site of this buried city is a mile to the north of Unaklesh.

The soil of the country is mostly sandy, and quite free from stones and rocks; it is very productive, from the circumstance of the fine dust being carried by currents of air from the desert

* I endeavoured to obtain ancient coins and records, but was informed that none were procurable at Ichi and Yarkand but only at Kasagar, the latter being an ancient city, and one of those which escaped being buried by the desert. Ichi and Yarkand are reported to have been forsaken after the above-mentioned destruction, and are therefore considered new cities. This statement appears to have some foundation, for I never saw or heard of a single ruin, though I made every inquiry, while Kashgár is said to contain extensive ruins.

and deposited in the plains. During my stay at Ilihi I noticed this phenomenon on several occasions; although there was no wind blowing, the whole atmosphere was so thickly filled with dust, that I was obliged to use a candle at mid-day to be able to read large print. The dust which fell was of an extremely fine quality, and of a very light colour, resembling pulverized clay. The inhabitants declare that this deposit is as good as manure for the soil, and that no vegetation would thrive without it.

The chief grains of the country are—Indian corn, wheat, barley of two kinds, barn, jowar, buck-wheat, and rice; all of which are superior to the Indian grains, and are of a very fine quality, from the circumstances of the climate being mild and more equable in temperature, with moderate rain in slight showers occasionally. The country is certainly superior to India, and in every respect equal to Kashmir, over which it has the advantage of being less humid, and consequently better suited to the growth of fruits. Olives, pears, apples, peaches, apricots, mulberries, grapes, currants, and nectars—and exceedingly large in size and of a delicious flavour—are produced in great variety and abundance. Besides these, the plant from which the churris is extracted is met with in almost every field; it differs slightly from the churris plant as found in India, having broader leaves, and growing to a larger size. Cotton, of valuable quality, and raw silk, are also produced in very large quantities.

The principal forest trees are the poplar, willow, and tamarisk. About the towns and villages these trees have been mostly planted, but between Khotan and Aksu, for a distance of twelve marches, there is such a dense forest of them that travellers are said to have lost themselves in it. Some of the poplars are reported to be of an immense size, and are used for the purposes of house building. The whole country is very rich in soil, judging from the splendid grass which is found wherever water has flowed over, even for a single day. I have a great variety of grasses, &c., as samples. The greater portion of the country is waste, for want of inhabitants, and the present produce is more than sufficient for the wants of the comparatively small population.

The whole country, especially the Ktun Lun range of mountains, is wealthy in minerals viz. gold, silver, iron, lead, copper, antimony, salt, saltpetre, sulphur soda, and coal; of this last I have samples. It is found near the village of Dâi in Khotan, and to the west of Yarkand, on the road to Kashgar. Gold and precious stones are chiefly found in the beds of the

streams, which issue from the Kün Lun range, and in very large quantities about Karungatik, Kiriá, and Chirá. It is said that 3,000 men are daily employed in the gold-fields. The ordinary value of gold in Khotan is Rs. 9 to 10 per tola, while in Kashmir the same quantity sells for 17 to 18 Rs.; this circumstance alone will show how abundant gold is, and how large a quantity there must be at the present time in the country.

The principal towns in the country of Khotan are Ikté, Kárá-kachá, Chongkash, Chirá, Kiriá, and Lak. Those of Yarkand are Yarkand, Peshgoff, and Kargalik; and those of Kashgar are Kasagar and Yangshahar.

The villages of Khotan are mostly small (with the exception of Karungotar and Chachan, which were Chinese penal settlements), and scattered, while those of Yarkand, such as Sungá and Kufáir, are very large.

Of the cities above mentioned, Yarkand is the largest, and is a great place of trade. The Bokhárá and Khokán caravans with sugar-candy, safflower, cloth, wrought iron, brass, iron vessels, and other articles, which are brought from Petropavlovsk, Semipalatinsk, Frounska, and Bokhará, after passing through Khokan, visit Yarkand twice a year, with as many as a thousand camels. Traders also from Vernoe, Ak Mased (Fort Perovski), and Hí, with horses, China tea, and silks, frequent this city in great numbers.

Ikté is next in importance, and is a great manufacturing city; the chief articles of manufacture are silks, felts, carpets, both silk and woollen, and coarse cotton cloths; some of these are used up in the country, and the rest exported to Yarkand and Lak. The raw silk produced is of very coarse texture, owing to bad reeling. Paper is also made out of the mulberry tree, and exported westwards.

Bazars or fairs are held in the city once or twice a week, in which most of the trade transactions in goods and animals take place. The Ikté bazar, which I visited, presented a very lively scene, both men and women being very anxious to buy and sell. I noticed that during these fairs very large quantities of meat, including camel and horse flesh, were consumed by the people of Central Asia.

The wild animals seen in the country are the goat, wolf, jackal, fox, and hare, all of which are of the Tibetan species. Bears, tigers, and leopards, are said to exist in the forest between Khotan and Akoi. Among the wild birds are geese, ducks, chikoor (large and small), pigeons, quail, kites, crows, and hawks, of which last species the karal (bear coot) is very

large, and of a black colour; this bird is kept by the natives for the purpose of hunting wolves, jackals, &c., which it seizes with great energy.

The domestic animals are camels (Bactrian), horses, mules, asses, cattle (Tibetan and Indian), goats, and Dumba sheep. The goats are to be met with in large flocks. Of the above, the camels and asses are used for lading, and the horses for riding and drawing wheeled conveyances which resemble the Indian country carts, but are lighter; they are generally drawn by four horses, one being in the shafts, while the other three go almost as leaders. Most of the horses in the country are not bred there, but are imported from Badakshan, Ili, and the country of the Kalmak Tartars,—the large horses being from the former place, and the gheonts from the latter, where they are reported to be very numerous, one slekh alone being said to have 10,000 mares.

The domestic birds are geese, ducks, and fowls, the latter being very abundant.

The chief sports of the country are hawking and a game called *Baj-Baj* (sheep wager), which consists in horsemen racing after one of their number, and trying to get possession of a sheep which he is carrying; this game is carried on until both horses and men are completely exhausted. The men of this part of Central Asia are mostly excellent riders; almost every man has one or more horses, and they seem to have a great dislike to walking.

The population of Ichi is about 40,000, and that of the whole country of Khotan about 250,000, the females preponderating over the males to the extent of twenty per cent. This inequality of the sexes is attributable to a number of males having left the country, some having been banished, and others killed during the late disturbances with the Chinese, Khokanees, and Kucharees. The men are mostly fine-looking, with fair complexions, and very well built; the women are rather short, but pretty; both sexes have a slight Tartar cast of features, and it is remarkable that both men and women are well and cleanly apparelled. The inhabitants are all Mahomedans. They speak the Turki language, and, judging from the numerous prayers they repeat, are very strict in the observance of their religious requirements.

The taxes of the country are moderate. The khán takes a tenth of all the produce, also of the gold and animals of the country; the same tax is levied on exports and imports, but the khán intends increasing the rates of taxation on goods imported from Leh, so as to equal the heavy duties imposed by the

Maharajah of Kashmir on the exports from Khotan. The khán informed me that he was dissatisfied at the exorbitant taxes levied on the exports from his country at Leh by the Maharaja's officials.

The current coins of the province are the kurus and pice. The kuru is a piece of silver, about 3 inches by 2, and about $1\frac{1}{2}$ inch in thickness, shaped like a boat; in Kashmir its value is Rs. 16½, though it weighs only 160 Company's Rs., the price being in favour of the kuru from its being almost pure silver. The pice are made of copper, about the size of our Company's pice, with a hole in the center. They are generally to be had in strings of 50, which is called a *tāngā*. In Khotan the value of the kurus fluctuates much, sometimes a thousand *tāngas* of pice are paid for a kuru, at other times only 380 *tāngas*. When I was in Khotan the rate varied from 600 to 380 *tāngas*. There is also another coin called "kurs," shaped like the large kuru, but its value does not exceed Rs. 16, the silver being impure. Gold is not current, but is sold in small packets, each containing a little more than 3 tolas; five of these packets are given in exchange for a kuru. The Khotanese use no weights, but dry and liquid goods are sold by measures. Their cloth measure is also nearly equivalent to the English yard.

The Khán of Khotan has an army consisting of 6000 infantry and 5000 cavalry; all, however, being very badly equipped, having only Chinese weapons. He has likewise a large artillery; I counted sixty guns of brass and iron, of all sizes, up to 12-pounders. The cavalry is commanded by Mustafá Khán Khepán (sahib), the khán's second son; the artillery by Hají Abráhim, also styled *Lashkar Chán*, his eldest son, and the infantry by a person who calls himself a Pathán, but whom I consider a suspicious character, probably a fugitive mutineer. The latter spoke Hindostani, and told me he had been in India, and had eaten the salt of the English. He and a trader from Junnoo, and a fakír, who said he had been a sepoy, were the only persons with whom I could converse without the aid of an interpreter.

The sons of the khán are rather short, being about 5 feet 8 inches in height; the eldest is slender, and very intelligent, while the other is rather stout and dull; both have fair complexions, but the latter has Chinese features. They are generally dressed in elegas of black satin, and gold-worked caps. The eldest son is the chief personage about the khán, and is the keeper of the seals and treasury.

The usual route from Leh to Ichi is over the Kárákoram

Pass, and through Suuji; but there are several others, which, however, have not been much used till very lately, viz.: the Hindoták diwán, the Brinjá diwán, and the Po'u route. The last of these is the best, as it lies over vast plains, where water, grass, and wood, are obtainable at every halting place. It is reported that wheeled conveyances may be taken from the Changchenmo Valley and Rudok to Ichi and Yarkand by it; the only difficulty which exists is, that a portion of the route passes across the Chángtháng Plain, which is occupied by shepherds from Rudok, who closed the road last year to travellers proceeding between Lashim, Ichi. I have submitted a few remarks relative to this and other routes, which will be seen in the sequel.

The route over the Kárikoram Pass is good but very difficult, owing to the want of grass and wood, the difficulties being enhanced at certain seasons of the year, when no water is obtainable, the whole of the rivers and streams, including the great Nubra, being frozen over. The cold is so intense that men and laden horses have been known to be frozen to death while in the elevated plain between the Nubra and Kárákash rivers. While I was marching over this place, in November, the cold was so great that I and the natives with me could get no sleep during the nights, and our barrels used to be covered with icicles while marching along the road in the sun. The thermometers which I had could not show the temperature, as they were not graduated below 15° Fahrenheit. This route is sometimes infested by Hunza robbers, who have established themselves at the village of Shingsoál, situated a little north of the Kárikoram. Only so lately as last season they plundered a very large caravan while on its way from Yáchan to Ichi, and carried the traders and their goods away to their own country, where they sold the former as slaves to traders from Badakshan, Chitrá, and Khokán.

The Hindoták Road, which leaves the Kárikoram route at Sukit, lies for two marches up the Kárákash River, and then crosses over the Kun Lun range by the Hindoták Pass. This route is short, but very difficult, and can only be used by foot passengers, on account of very difficult and extensive glaciers on the northern side of the pass.

The Brinjá route, the one I travelled over, crosses the northern ridge of the Changchenmo Valley, and over immense plains perfectly unhabited and void of all vegetation, with the exception of the lavender plant, which is stunted, and only found occasionally, fresh water is also very scarce, that of the numerous lakes in these plains being very brackish, and in

many places undrinkable, owing to the whole of the country being covered over with a deposit of saltpetre and soda, to the depth of from six inches to a foot. The plains have once been the beds of those vast lakes, judging from the water-marks and banks which are distinctly visible. At the northern extremity of these plains the road dips suddenly down to the Karakash River, where a little grass and wood are found, and thence leads up the snowy passes of Brinjgá, which are very high and difficult, from the circumstance of there being immense quantities of snow and ice on them; horses can be taken by this route, but not without a portion of the road between the Karakash and Brinjga being cleared of snow and stones. From the encampment of Brinjga the road follows down a ravine for one march, and then crosses over numerous passes and streams, including the Khotan River, which is crossed by a wooden bridge, till it gets into the plains of Khotan near Bezihá. The route, on the whole, is very difficult, firstly from the intense cold and the want of fuel and water at the above-mentioned places, secondly, from the height of the passes of Brinjgá, and lastly, from the road between the latter place and Bezihá being very steep and dangerous, owing to the numerous ascents and descents which are met with.

There is also another route from the sources of the Karakash River to Khotan *via* Shadulá; it follows the Karakash River the whole way, passing the above-mentioned place on the sixth day. The portion of this route between Shadulá and Khotan can only be used in the depth of winter, when the water is very low, as the river, which is of considerable size, has to be forded frequently. The Khotan people declare this is the route which was taken by Rustam, a famous hero, when he travelled from Kháshgár, the place of his abode, to Radok and Iassí.

The routes chiefly used by traders from Leh to Yárkand are those *via* Kuglár, Káshán, and Saupí; of which the two last named are closed during the winter from the passes being high, while the former is open all the year round, but dangerous at all times, from its being infested by robbers. The taxes at Leh are now levied by Mangapí, thanedar of Ladák, and not by contractors, as formerly. It is an extraordinary arrangement that most of the traders from Leh to Yárkand are agents of the Maharajah, and do not sell their own goods; this custom interferes with general trade. The thanedar, being the customs' officer and chief official, has power to demand whatever cess he thinks proper from traders who are not agents of the Maharajah. In conversing with the traders and others on the subject of improving the trade between Central Asia and the Punjab, I

learnt that they were anxious that a competent Government agent (a European if possible) should be located at Loh, to look after the interests of the traders, who, I must admit, are badly treated, and to maintain friendly relations with the people of Central Asia, who are very well-disposed towards the British Government; great advantages, both commercial and political, were expected to result from such a measure. There was also a wish that the several routes beyond the Karakoram should be made safe, by the Maharajah detaching guards of adequate strength to occupy the ground within his boundary, in the vicinity of the plain called "Khergis Jungle," on the Kugur route, and at Shāndū and Dugar on the Samji route. The guard of twenty-five men which the Maharajah had at Shāndū last season proved insufficient for the protection of the *kailās*, as some of them were plundered by robbers. The object of having these guards stationed along the route is to enable them to escort caravans when passing over dangerous ground. The road from Loh to the Karakoram requires to be repaired and put into thorough order, to enable laden ponies to travel in safety, especially over the Sarsū and Kharitorg passes. This could be effected by the Maharajah at a very moderate outlay, and would be a great boon to traders, who, under present circumstances, almost dread going over the places referred to, owing to their horses being lamed by the sharp stones on these passes, where no footpaths even exist. That some steps of this nature are necessary is evident from the numerous carcasses of animals to be seen in every direction. If the Maharajah, following the example of the Chinese, erected post or rest houses on the road from Loh to Yarkand at the several halting-places within his territory, the inconveniences of travelling in that rugged and barren country would by no means be inconsiderably lessened.

These remarks merely refer to the shortest and most direct routes to Yarkand and Khotan, which would certainly be preferred to the route *via* Polu, did the former not labour under the disadvantages named. I would, however, desire to offer a few remarks on the newly suggested route from the Chang-chén-mo and from Rudok, *via* Chingthang to Polu, a village five marches south-east of Hchi. The only hindrance to this route, now that friendly relations have been established with the Khān of Khotan is the opposition of the Tartar shepherds of Rudok, who, I am of opinion, could be induced to allow traders to pass through their country by the offer of a small pecuniary payment, guaranteed by the British Government. The opening of this route would be particularly advantageous

to the Punjab traders, as they could evade the taxes levied at Loh, by proceeding direct to Rudok, *via* the Hindostan and Tibet Road, up to the Chinese boundary, after which they would pass over the Chianurh plains to the Indus, and thence to Rudok, without touching on the Maharajah's territories. Rudok can also be reached from Kulu and Manu by crossing the Bataluhá Pass, and going over the Rakshú Pass to Hane, but this is in the Maharajah's territory. The route *via* Rudok and Puli, though circuitous, has many advantages over others, the chief of which are—that wood, grass, and water, are obtainable at every stage; that the road passes over no rugged and high snowy ranges like the Sarsil and Karákoram passes; that it is safe from robbers, that it leads not only to Ili and Yarkand, but also, *via* Loh, to the large and important city of Karashahar, situated about 300 miles north-east of Ili, and which, with numerous other places of note, are occupied entirely by Kirrak Tartars and are on the high road from Kashgár and Ili to Peking. By this route, the highly-valued Usteriani shawl wool (superior to the Changtáng), which is produced from the goat found in the Aktag or Thian-shan range of mountains, and a variety of other merchandise may be brought down in large quantities for the Punjab and English markets. At the present time there is an excellent opening for exports from India, because all trade between China and the Mahomedan states of Central Asia is at a complete standstill. The Manchus, being great tea consumers, would gladly receive Indian teas, at rates which would probably be very remunerative, while the Kirraks and other Tartars would be excellent customers for opium, which may be sent to Karashahar and the cities of the East. By this route Ili may be reached from the north-west provinces of Hindustan, *viz.* from Delhi, Rohaud, and Meerut, to Gartek (or Gartope), lat. $31^{\circ} 10'$, long. $80^{\circ} 10'$, and Rikk, lat. $33^{\circ} 24'$, long. $79^{\circ} 25'$, *via* Almuun and the Niti Pass, and *via* Mussorie and Gangotri, over the Nang Pass; both the routes being very feasible, especially the Niti one.*

If the several measures suggested in the preceding paragraphs were fully carried out, not only would the trade with

* Whilst in Khotan I was informed that there was a great demand for tea since the stoppage of the trade with China, and that the people of the country would gladly procure Indian teas, if obtainable. The inhabitants of Khotan are great teashrinkers. All who visited me, rich or poor, asked for a cup of tea, which is drunk with sugar but without milk. As a mark of respect, a cup of tea was presented to me by the Ká of Khotan himself on my first interview with him. The drink from tea is preferred to every other.

† Beyond Rikk and Gartope there is a village called Musar, lat. $31^{\circ} 10'$, long. $80^{\circ} 10'$, from which the amánjau receives a revenue of Rs. 500 per annum.

Central Asia be increased and improved, but the advantages, in a political point of view, would be considerable, as it would secure a ready market for the products of India and Great Britain, and afford us a better knowledge of the countries north of the British frontier.

The Khán of Khotan resides in the old Chinese fort, which is built of earth, and consists of an inner wall about 20 feet high, and an outer one of 5 feet, with a ditch outside. The houses in the fort, including the khán's dwelling, are all built of mud and wood, the doors and windows being of lattice-work (very like those in Kashmir). Whilst I was in Khotan, a mud wall, 25 feet high and 20 feet thick, was building round the entire city of Ichi. Similar walls are also constructed at Jabi, Pulmá, and Gámi, their object being to secure the inhabitants of these places against sudden attacks. The khán has done away with all the Chinese customs, except that of keeping watchmen, who patrol the streets of the fort and city at night, and make a great noise by striking a hollow piece of wood with a stick. He has also retained the Chinese instruments of torture, viz., the rack, which is worked by screws; the tread mill, and another instrument for extorting confession, which consists of a wooden bed covered with sharp stones and gravel, on which a culprit is made to kneel, while a log of wood is laid over the knee-joints, thereby causing excruciating pain. Hanging and flowing away from guns are the methods of capital punishment; gallows are erected in various parts of the city. Flogging with a leather thong is also largely resorted to: men and women being flogged indiscriminately. The khán is trying to improve the morals of the latter, which were none of the best during the time of the Chinese, from the fact of their coming into Turkestan without their families, and keeping the women of the country.

During my stay at the capital of Khotan, I employed myself in extending my researches, by making a hasty journey to the town of Khrá, situated about 10 miles east of Ichi. I rode there in one day, on horses posted for me by the khán; spent a day there, and returned on the third, having meanwhile left my trunks in Ichi. I also visited the site of an old city near Urangkúsh, from which brick-tea is obtained. I experienced great difficulty in taking observations to the sun and the pole-star for determining the latitude of Ichi. The khán, though he offered no objection to my using the plane-table, expressed himself decidedly opposed to my taking astronomical observations, alleging, as a reason, that his courtiers considered that it might be a preliminary to the country being taken possession of by the

British Government. In consequence of this obstruction, I had to resort to the expedient of locking the door of the court-yard fronting the house I occupied, to carry out my object. The instructions to my men to keep off intruders were not easy to enforce, as my actions were closely watched, and the khan's sons were in the habit of calling to see me at all hours of the day, and very frequently at night. After leaving Ili, I was not able to observe for latitude at any other place, save Samu, where, by the happiest chance, I put up in a house with a large hole in the roof, which admitted of my observing with the *sun li theodolite*. Here, too, as at Ili, I was obliged to take the precaution of locking the door. Boiling-point observations for determining heights were taken at every halting place, Ili included.

It will not be out of place also to mention that, on three occasions, I was asked by some of the natives of Yarkand to visit that city, and take possession of it in the name of the British Government; but I explained to them that I had not visited Khotan in any official character, but simply as a surveyor, come to survey, and desirous of information as to passing events, and not to carry out any political objects. I was informed that the Yarkandees, Kashmirees, Baltees, Turganees of Yarkand, and other towns and villages, had clubbed together, and collected three lacs of rupees and khulats as a present for me, if I would only come on and take up the governorship of Yarkand, as they were tired of anarchy, confusion, and constant warfare with one another and oppression at the hands of the Khokanees. The promise of this sum of money and offers of governorship were presented to me in writing by the beg of Kuglâr (parganâ of Yarkand). Had not Yarkand been in a disturbed state, I would certainly have visited it in the course of my operations to collect further information; but the country and city were reported to me to be divided, and held by three separate parties or factions viz: 1st. The old Chinese fort and city by the Turganees, who are Mahomedans, and were employed as paid soldiers by the Chinese, against whom they mutinied in 1863. These Turganees are not men of the country, but came from the far east, near the confines of China Proper. 2nd. The Mahomedan town was held by Kadmirees and Baltees of Iskânle, from the territories of Maharajah Rambeer Sing. They have settled in Yarkand in large numbers; the former for the purposes of trade, and the latter, being agriculturists, for the cultivation of the claret plant, which they have brought to great perfection. 3rd. The country about the city was reported to be occupied by the Khokanees, who, on being pressed by the Russians, deserted

their own country, and, through the aid of the Chubchik, governor of Kashgar, took possession of the country of Yarkand. From my inquiries I am of opinion that the natives of Yarkand are very like those of Kashmir, a servile race, constantly conquered and oppressed by the neighbouring states.

The Khán of Khotan, at the final interview I had with him, after entrusting a letter to me for His Excellency the Viceroy of India, together with the presents (four horses and two pairs silk carpets), all of which were delivered over by myself to the Assistant-Secretary to the Government of the Panjáb, asked me to beg of the British Government to send him assistance in the shape of troops, arms, &c., and said that he would supply carriage and provisions from his boundary to Ichi, but that he could not afford to pay the troops, as his country was poor; he, however, proposed that our Government could reimburse themselves by annexing the cities of Yarkand, Aksu, &c., to which step he would render every assistance. As far as I could observe, it seemed to me that arms and ammunition, with a few blacksmiths and tools, were all the material aid needed by this friendly power. With these, and the loan of some native non-commissioned officers to drill and discipline his troops, who are next-door to warfare from their continual conflicts, the Khán would be enabled to repel aggression, and preserve the independence of his territories.

Before taking my leave of the Khán he presented me with a yellow khakiab chiga, as a dress of honour, a Yarkand pely, and a carpet. In return, though he objected to my using the 8-inch theodolite, he expressed a great desire to possess the instrument. I explained to the Khán that, as the arms bestowed on a soldier were the property of the State, so the theodolite in my charge was only entrusted to me for a given purpose, to enable me to carry on my duties, and that I should be disgraced if I returned without it, and would incur the displeasure of my superiors if I parted with the instrument. I also made the Khán understand that the theodolite would be of no use to him. As a compromise, I took upon myself to tender two telescopes, the property of Government, for his acceptance, and in my own behalf made the following offerings: A double-barrelled rifle, a revolver, a hogskin saddle, a set of head-stalls and reins, a pair of epaulettes, which I had provided myself with in ant expectation of needing to make presents on the frontier, six country swords, stationery to the amount of 15 rupees, a supply of gunpowder, shot, and gun-caps, besides cloth, and other trifling articles. To the Khán Tashih of Khotan I presented the customary pazaar of the country, viz.: 6 kurus, or 803 rupees, and to

his men on escort duty with me on several occasions cash to the amount of about 625 rupees.

On the 4th of October, after a stay of sixteen days, and after exacting a written promise from me to return to Khotan, if permitted to do so, the khán allowed me to take my departure. On leaving Iliki, I first travelled along the high road which leads to Yarkand to the village of Zalgia, at which place I halted my baggage for three days, and pushed on by post-horses to visit the villages and towns along the same road as far as Luk, in the Yarkand territory, and about 36 miles east of the city. After advancing into Yarkand as far as it was safe for me to proceed, I returned by the same route to Zalgia, from whence I proceeded to Sanju, in lat. $37^{\circ} 3' 57''$, and long. $78^{\circ} 21' 30''$, and crossed into the valley of the Kárákash River, by the Walagot or Sanju Dáwin Pass. I then followed the course of this river, marching up its right bank for four days, to the Maharajah's guard-house at Sháhla, in lat. $36^{\circ} 6' 15''$, and long. $78^{\circ} 29' 30''$.

On my route from Sanju to Sháhla I passed several encampments of Kherghiz shepherds, on either side of the Walagot Pass. These people are difficult to deal with, being noted robbers. Twice they insisted on examining my baggage for valuables; but, finding none, they permitted me to proceed without further molestation, on being entreated to do so by Hoi, beg or governor of Sanju, who was ordered by the Khán of Khotan to accompany me as far as the Maharajah's boundary, for the purpose of insuring me a safe passage through these Kherghiz, with whom the beg of Sanju is on friendly terms, owing to these shepherds visiting Sanju occasionally for the purpose of bartering their sheep for other necessaries of life. The Kherghiz are Mahomedan shepherds, and are to be met with in the mountains to the north of Khotan and Yarkand and in other parts of Central Asia. They live chiefly in hilly tracts, where good pasture is obtainable for their flocks, and are distinguished from other men of Central Asia by their wearing blue-and-white striped cloth, and being always armed, generally with matchlock, sword, and dagger.

While travelling over the route from Iliki to Zalgia and Luk, this portion of the country also appeared to me to resemble the plains of Hindostan, being a vast plain, without any mountains in sight. On leaving Zalgia for Sanju, I, for the first time after many days, observed the lower spurs of the Kium Lun Range; and on nearing Sanju, which is situated in a ravine immediately at the foot of these low hills, I almost fancied I was on the road between Futtchpoor and Mehun, at the foot of the Sewalik. Quitting Sanju, and proceeding to

the Kárákash Valley, the features of the country underwent a complete change; here no level ground was to be seen, but lofty rugged mountains intersected by deep narrow ravines, especially near the Wulágot Pass, where the hills are so elevated as to be covered with snow for the greater part of the year. The last portion of the route to Shádulá is particularly pleasant, being the whole way up the Kárákash Valley, which is wide and even, and shut in on either side by rugged mountains. On this route I noticed numerous extensive plateaus near the river, covered with wood and long grass. These being within the territory of the Maharajah of Kashmir, could easily be brought under cultivation by Ladákese and others, if they could be induced and encouraged to do so by the Kashmir Government. The establishment of villages and habitations on this river would be important in many points of view, but chiefly in keeping the route open from the attacks of the Khérghiz robbers.

I reached Shádulá on the 16th of October, and was detained there no less than twenty-four days, awaiting the arrival of the coolies I had written for to Leh. This delay in the arrival of the men was caused by the misarrangement of the several letters I had forwarded to the thánédár of Ladák. During my detention at Shádulá I employed myself in ascending several peaks, both to the east and west, for the purpose of sketching the country. I also visited Khérghiz Jungle in lat. $35^{\circ} 11' 0''$, and long. $77^{\circ} 46' 30''$, and other places on the Kuglár route, to accomplish which I had to travel over a barren country, by the Khérghiz Jungle Pass, to the encamping ground of that name. This place is named "Khérghiz Jungle" from the circumstance of its having been frequented formerly by Khérghiz. It is now visited occasionally by Kanjati or Hunzá robbers. I should have extended my explorations in this direction further, but was deterred from doing so, through fear of meeting these robbers, who were reported at that time to be moving about these parts. I saw a large party of them on one occasion, at a distance of about two miles, through a telescope. The Kanjati robbers (who are not shepherds) lie in wait for caravans at Aktág and Kulánulki, on the Kuglár route, and carry their captives and plunder to a place called Shingshál, on the north of the Kárákorum. Their fastnesses can only be approached by troops operating against them from Aktág and Kulánulki. Under these circumstances, and not wishing to run the risk of being taken captive and sold as a slave in Badakshan, I retraced my steps to Shádulá.

I finally quitted Shádulá for Leh on the 8th of November,

first marching up the left bank of the Kárákúsh River, and then turning west up the broad and open valley called Sukit, at the head of which I crossed the Sukit Diwán Pass by an easy ascent and descent, and reached the undulating plateaus between the Sukit Diwán and Kárákoram passes. After this I crossed the Kárákoram Pass (height 18,317 ft.), also by an easy ascent and descent, and then followed down the course of the Hálti Pulú Ravine till it joined the Sheók River, on the right bank of which Gapshan is situated. The general features of the country travelled over since crossing the Sanjú Diwán are low barren hills and elevated plateaus, destitute of all vegetation and water, from the streams being frozen at this season of the year.

From Gapshan I continued to march down the right bank of the Sheók River, which joins a stream from the Sarak, up which I ascended, and, crossing the Sarak Pass, descended to the village of Changlung in the well-known valley of the Niobra River. I then proceeded down the left bank of the Niobra River, *via* the villages of Páimik and Chati, to the Sheók River, which I crossed about a mile above its junction with the Niobra stream, and next proceeded, *via* Khardong Village, over the pass of the same name, and descended to Leh, which place I reached on the 1st of December. This portion of country consists of high snowy ranges and deep valleys.

From Leh I marched to Keshmir by the usual road along the Indus River, *via* Khalaizi, Kargil, Drás, and Sonámaraz, and reached Srinagar on the 10th of December. Winter having set in, this portion of the journey was disagreeable and difficult. The whole of the country between Láma Yúra and Srinagar was under snow; the Drás Pass was covered over with 4 feet of snow which being fresh, rendered travelling so tedious and tiresome that my party was benighted on the pass, and nearly perished from having to sleep without covering on the snow. A and six of the natives with me suffered severely from frost bite.

After halting a few days to recruit ourselves, and to enable the party to get cured of the frost bite, I left Srinagar for Jhelum, *via* Batámullá, Bágh, and Míspur, the other routes being closed. This being a long route, and the entire country from Srinagar to Bágh being under snow, I was not able to reach Jhelum till the 28th of January. From Jhelum I marched down the Grand Trunk road to Umballa, and thence to Dehra Doon, which place the camp reached on the 28th of February, 1866.

As regards the geology of the portion of Central Asia visited

by me, my knowledge of the subject is very limited and imperfect, but I noticed the following in different parts of the country.—Between the Chángshénmo and Kárákúsh valleys there are to be found clay-slate, shingle, and quartz, also conglomerates containing fossil shells on the watersheds of the three lakes mentioned in this report. Between the Kárákúsh and Bríngá, the Kian Lun range runs almost east and west, having a greater fall on the south than on the north. Its high spurs are composed chiefly of granite, quartz, and shingle; while the low spurs of the same range, which run down almost parallel to one another to the north, consist of sandstone and hard clay, and the soil of the plains below and to the north of these spurs from Kirá to Sanju is a mixture of sand and clay. The country between Sanju and Korómlakpíga is like that to the north of Bríngá, while that between the latter place and Shádulá on the Kárákúsh River is composed mostly of quartz, granite, slate, and shingle. The ground between the Sukit Duwán and Kárákoram passes, and down to Gapshan, consists chiefly of slate and shingle of various colours, conglomerate being seen in small quantities. A few fossil shells were found by me immediately below, and to the south of, the Kárákoram Pass last season.

I would mention that some of the men of the Native Establishment, *viz.*,—Nar Dux and Lumín Allí, barkandászes, and Mátadin, lampman (the only natives of Hindostan with me), did excellent service, especially the first. I must also bear testimony to the great assistance which I received from Jumán Khán, the Turkistani interpreter, while travelling in the provinces of Central Asia. All these men, as can well be imagined, had many and trying difficulties to contend with, and I hope I may be permitted to urge their claims, and to recommend that the three men of the native establishment whom I have referred to by name be rewarded with a gratuity of six months' pay each.

My survey was based on three previously-determined Trigonometrical Stations on the Kian Lun range and was executed with a plane-table, which was set up on positions, mostly high hill-peaks, which are particularised in the map, from whence I sketched all the ground in view. I carried on the plane-tableing from my starting stations to Iliú, and then round, *viz.* Sanju, to the vicinity of the Maharajah's guard-house at Shádulá; from here to the Kárákoram Pass is a distance of six marches, or 60 miles, as the crow flies. I would willingly have carried forward my plane-tableing to the Trigonometrical stations on the Kárákoram, for the sake, not only of sketching the country, but of

verifying my work, but the winter had set in, and the intense cold rendered it impossible for me to use either pencil or brush. I nowhere attempted to take astronomical observations for longitude, but I determined the latitude of Ilchí and of Sanjü by observations to the sun and the pole star, the result of which agree with those independently obtained by the plane-table.

A trace of my plane-table sections, together with several routes in Central Asia, about which information was received when I was in that country, are herewith forwarded.

Dehra Doon, April 22, 1866.

MR. JOHNSON'S ITINERARY. ROUTE I. FROM LADAK TO HIAH.

Number of Miles	Place	Estimated Height in feet above sea-level	Height in feet above sea-level	General Description	Remarks
	Ladak		11,343		Capital of Ladak. Well known.
1	There ..	13	..	E.	Large village and monastery. The village is situated in a plain, on the right bank of the river Indus. The monastery is on the east of a spur, immediately to the north of the village. The monastery is a popular garden, as the monastery is a small sacred lake. The village of the Indus and about the village is irrigated by canals from the Indus, and is subject to inundation when the river rises above its usual height.
2	Chinre ..	16	..	N. & S. E.	Large village and monastery. The road runs along the right bank of the Indus for a distance of 11 miles till it reaches a large garden where it turns north up the Sakto river, on the right side of which the village is situated, on ground ascending in steps. The monastery is erected on the knob of a spur to the west of the village. Encampment in a small garden of poplars to the east of the village.
3	Zingrol ..	11	..	N. E.	Encampment in a small tank, which is a grazing-ground belonging to the village of Chinre and Sakto. The road runs up a narrow for a mile till it reaches the large village of Sakto, which is situated at the junction of two rivers of the Indus, one of which is said to be the Sakto, and the village of Talyar, which he said to be up that which runs down a steep descent from the Chinre Pass. The village of Sakto is situated in a depression of steps. Ascent between Chinre and Zingrol very steep, being the best part of the ascent to the Chinre Pass, which renders the ascent from Zingrol to the Chinre Pass very easy. No houses at this place.

Small village, situated at a point on the left bank of the Chushul River, from whence three roads strike off, viz., to Taitiyar, to Sheók, and to Tátkái, and where stands a large storehouse belonging to the Maharajah. The River Chushul contains fish, principally trout, which are very good. The ground about the village is bare of trees, but is well cultivated. The road from Zingrul to Durgá is on the whole good, crossing the Changlá Pass at a distance of 4 miles, and then down a ravine which joins the Chushul River immediately below Durgá. At a distance of 7 miles from the Changlá Pass the road crosses the ravine, and passes for a mile over a spur to Durgá; the end of the spur is exceedingly steep and sandy. Stone wall embankments have been erected across the ravine above Sakri, with the object of collecting the snow in masses during the winter months. These masses remain below long after the snow on the hill-sides has melted,—an ingenious expedient for keeping up the supply of water for irrigation purposes during the summer. During the season of 1862 a glacier was crossed on the Zingrul side of the Changlá Pass which was found last year to have disappeared.

Small village, situated on the banks of a small stream which is supposed to have once drained the Pangong Lake above its junction with the Chushul River. The village is noted for its storehouses of hides, skins, horns, and grain being kept here for the Maharajah. All coolies, provisions, &c., are taken from this place by travellers visiting the Chángchémo, and other parts. An attempt has been made to plant out a willow garden, but on account of the intense cold during the winter the trees remain small and stunted. There are two roads leading from Durgá to Tátkái, one along the right bank of the Chushul River, and the other along the left; the latter road crosses the river by a small bridge made of willow-branches, covered with smooth slate-slabs, which, being loosely put down, render the bridge dangerous. The road on the right bank is good, and crosses the river by a ford about 1½ mile below Tátkái. There are several roads leading from Tátkái to different parts of the country, the chief one being to Chushul south of the Pangong, and to Sherá and Igrá on the banks of the Indus, *old Sasákúli* village.

x.x.

..

15

..

Durgá

4

x.x.

..

7

..

Tátkái

5

Route I—From Lifu to Nam—continued.

Number of Miles.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	Remarks.
6	Sowar or Chiré.	13	..	E. Encamped on the bank of a small lake, about 5 miles west of Pangong. Road good, but it is necessary to pass the whole way; passed Miglib village, 3 miles from Taki. The banks of the stream are covered with grass, affording good grazing for cattle. The wood procurable for fuel is chiefly willow and birch. The mountains on either side abound with wild goats (goats). The lake contains fresh water, which, being supplied by the melting of the snow on surrounding mountains, does not reach until late in the evening, and flows for only a few hours. No houses at this place.
7	Chagri	15	14,517 v. & x.	Encampment of shepherds. This place is situated in an open ravine, which descends from the ridge which bounds the Pangong valley on the south, and is a well-known grazing ground. The cattle of sheep and shawl-wool goats, belonging to the shepherds of the Pangong district, are kept here all the year round. The road from Sowar to Chagri is about half a mile of the western end of the Pangong Lake, proceeds for 2 miles up the valley on which, however, it is situated when it runs up the Chagri ravine, the water of which flows into the Pangong Lake, passing the village of Lankam at 11 miles. Wild lavender-bushes very plentiful. Numerous fish meet with in the Chagri stream. The wild horse hunting and wild goat are to be met with on the hills on either side of the valley, these animals can be hunted with ease, since most of the hills are in gentle undulating slopes, and are covered with shrubs. Salt is extracted from the water of the Pangong at a distance of 14 miles east of Lankam village, this salt is used very largely.
8	Randi	11	..	E. & v. a. Situated at the junction of two streams, one of which flows north from the Mawruk Pass, and the other west east from some high snowy peaks. Randi is also a grazing ground, visited occasionally by the Pangong

short-ride. The road from Chagré is, on the whole, very good: it lies up a ravine at a steep ascent to the Mianik Pass, 5770 feet, which is crossed at 7 miles and then descends down the ravine to Kandi. The ground, on either side of the Mianik Pass is rather dangerous, from the earth being rendered loose by the melting of the snow on the pass, it is necessary to have a guide from the Chagré encampment to lead travellers over the far side of the road. Kang snags, and the wild yak are to be found on the numerous high hills of which those to the west of the pass are very steep and covered with snow.

Visited at the well-known grass-ground, visited occasionally by the Pangong shepherds during winter it is situated at the junction of the stream from the Mianik Pass with the Changchomo River. The road from Kandi goes down the course of the Mianik stream grass and wood are plentiful; of the latter there is a perfect jungle chiefly of tamarisk-bushes the wood of which is sawed, but of a good quality. There are to be found in great numbers in this jungle. The ground about the Changchomo Valley is barren and rugged low hills rocky at the top and covered with clumps of various colours, are to be seen in almost every direction.

Visited at the hot springs for which the Changchomo Valley is celebrated. These springs are visited by Tartars of the Pangong district and of Nyul Kaidoh by the latter chiefly during winter. The water the temperature of which was 159 in the month of August, has an off-putting smell and taste, being impregnated with soda and sulphur. It is said to be beneficial in cases of rheumatism, &c. The ground about the springs is covered with scum to the depth of about two inches, the soda is reported to be of good quality, and is exported to Leh, &c. where it is used by the people to and in making their tea. This place is situated at the end of a spur on the left bank of a stream running down west from the Kapsang or Ne Pass into the Changchomo River, and at a distance of about 2 miles above their junction. The road from Pametian is over steep ground, covered with sand and boulders, up the left bank of the Changchomo River for a distance of 2 miles, when it crosses and recrosses the river the fording being difficult in summer from the water being cold, deep, and rapid. The fording can only

M. S. S.

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14

Panchdian ..

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17,045

12

Kiam ..

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Route 1.—From Lari to Kiam—continued.

Number of Marches	Place	Estimated Distance in Miles	Height in Feet Above Sea-level	General Bearing	Remarks
11	Lidmáng ..	18	17,801	N.W.E.	<p>be offered at certain hours in the morning, when the water subsides partially. The Chang-chien Valley between Lam-bikun and Kiam is wide and open, but has a wild appearance. There is a general want of vegetation till the route approaches Kiam, where grass is plentiful and lavender bushes are to be seen on the hillsides to the south of the springs. This part of the country abounds with wild antelope, kiang, and yak. A few hares and marmots are also to be found.</p>
12	Nachá ..	20	17,690	N.	<p>halted in an open ravine 4 miles south of the pass of the same name, and at the foot of the range of mountains bounding the Chang-chien Valley on the north. Road crossed the stream immediately to the north of the last springs, and then over a low spot at 8 miles from whence it runs up the Yarkung ravine, which joins the one from the Kiang Pass about 5 miles above Kiam. A small quantity of grass and wild lavender found here. Tibetan antelope very numerous.</p> <p>Halted at the junction of the stream which flows down north from the Lidmáng Pass with one that runs down from the east. Road found, in a distance of 5 miles, to the top of the Lidmáng Pass 10,535 feet. It lay up a gradual ascent and then descended gently down the ravine to Nachá where our camp was on the Lidmáng Pass at the foot of the ravine. The ravine in which Nachá is situated is steep, and confined by high spurs from the southern Chang-chien ridge. Lavender is found here in small quantities, but no grass.</p>
13	Burchatang ..	18	17,425	N.	<p>Halted near a small stream which flows down from the south. No wood or grass met with. Road good running down left bank of the stream, soon Nachá, for a distance of 8 miles, where it leaves the stream, and crosses several very low and broad spurs <i>over</i> crest of a small lake, and, passing a low spur, descends by a sandy ravine to this place.</p>

16 Tsochang .. 20 17,024 M. Halted near a small salt-water lake, road good the whole way, leaving over a pile which has the appearance of having been the bed of a large lake; the soil was covered with salt-petre to a depth of about 6 inches. Where on the road no bars were observed, a westerly direction. No grass but a little wild *amaranth*, to be obtained immediately to the north of the lake, the water of which is brackish. A few Tibet antelope were seen; these animals seem to live chiefly on the *amaranth*-plant.

15 Haidikhar .. 15 15,044 K. Halted about 20 yards to the east of a small lake, which is difficult of discovery, from its being so deep below in a plain. The water of the lake is brackish, but a small spring of fresh water flows out of the high bank into the lake. The road, on having previous rampant, lay for a mile up a gentle ascent, to the height of about 200 feet, and then descended gradually for about 6 miles the fall on the northern side being much greater than that on the southern. This small ridge separates the dry bed of the lake crossed on previous stage from a similar one to the north. When on the ridge, a traveler almost imagines he is out of the lake, although he is still in the expanse of the salt country, with the exception of that ridge, where the beds rise to a greater height, but the appearance of having been the beds of very large lakes of various levels and seems to be as good as the present time is inundation in the mounds of April and May, during which period the snow melts on the lake.

16 Mupothang .. 16 15,050 K. Halted immediately to the north of a small salt-water lake, which is situated at the foot of a pair of a hill, and at the southern end of the second great plain travelled over. The road for a distance of 12 miles, lay down a broad sandy plain and then turned up a spur to the left, and descended to this place, where there is no wood or grass. The water in the lake is brackish.

17 Yangpé .. 20 15,279 K. Halted on the left bank of a small stream, the water of which is slightly brackish, then got to the lower end of the Kuan Lou range, which is to the north. Kuan Lou is an *extensive* plain covered with several lakes, the water being exceedingly brackish, and having a very offensive taste. The

ROUTE I.—FROM LAM TO ICHU—continued.

Number of Mares.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Remarks.	Remarks.
14	Kashkash	14	15,491	x	<p>plain seems to have been a very large lake, judging from the water-marks to be seen on the low sandy spurs which are visible just before getting to this pass and the quantity of sediment which lies on the ground to the depth of about 9 inches, which is so white that, on looking down from a height, the whole plain has the appearance of being covered with snow. Wild lavender and grass to be had here in very small quantities.</p> <p>Visited on the left bank of the Karakash River, at a distance of about 20 miles from its source in the Kunlun range, which lies immediately to the north and east; the river flows west from this point for about 40 miles, and then turns to the north-east. A few stone houses have been erected on the right bank of the stream by Juma Khán, ambassador from Khotan to the British Government. Route lay up a sandy ravine to the Khatai Dzun Pass, height, 17,511 ft. for a distance of 8 miles, then over a dry bed of a large lake the third met with, and descended by a very abrupt fall to the river. Judging from the water marks which exist, the lake appears to have once flowed into the Karakash River. There is a good road from this place along the left bank of the Karakash River to Shufu, a small town on the route between the Kumukorum Pass and Yarkand. Large quantities of lavender and a little grass to be found here.</p>
15	Tash	19	15,563	n.s.	<p>Visited at a station that existed by Juma Khán on the left bank of the Yangna River, Lavender to be had here. On leaving the Karakash the road lay up a ravine to the Yarkun Dzun Pass, height, 9,992 ft., the ascent to which was steep and difficult, on account of there being a large quantity of ice and snow in the ravine and on the pass. After crossing the pass the road runs down a ravine to this place. The bed of the Yangna River is a gold-field, and was much frequented about three years ago by Khotan</p>

people for the purpose of digging for gold. On reaching the top of the Nam Kuan Pass I was very wet, so before the great change in the general features of the country which to the north is rugged and broken, descended to the southern H. mountains which on the south is almost a plain. The Yangki Dwan Pass can only be crossed during the months of June, July and August. It is reported that this route was discovered and used for the first time by Juma Khan.

Halted near a stone hut, situated near the junction of the Yangki River with a large stream which flows down north-east from the Nam Kuan Dwan Pass. The road is steep and bad, from its being down the rocky bed of the Yangki River. No wood or grass obtainable.

Halted near some underground huts occupied by shepherds from Khotan, in charge of cattle belonging to the kag. This is a famous grazing-ground, the grass growing to a height of two to three feet. The hillsides are covered with the wild yam plant, which is used as a medicine by the people of Central Asia. Wild goats, sheep and mules abound in this place here in large numbers. The road from Khablas to Yangki is very bad; for half the distance it runs on a rocky surface, and crosses over a large glacier and the Nam Kuan Dwan Pass height, 13,659 ft., the ascent to which is very steep. After crossing the pass, it runs over a small glacier, and descends very abruptly to H. g. The passes viz, the Yangki Dwan and the Nam Kuan Pass—are in the Khamtan range of mountains which are for the most part very rugged and steep, and are composed chiefly of loose shingle, with granite rocks above.

Halted at a stone hut on the right bank of the Yangki River. The road is particularly rocky and dangerous, from passing over a succession of steep and rugged hillsides running down to the river from the plateau on either side, the bed of the stream is therefore very contracted. Large quantities of coarse grass and reeds found here.

Village of about ten houses which are chiefly occupied by convicts and exiles from the cities of Kashgar, Yarkand and Khotan. The road for the

20	Khablas and Yangki	14	13,048	S	Halted near a stone hut, situated near the junction of the Yangki River with a large stream which flows down north-east from the Nam Kuan Dwan Pass. The road is steep and bad, from its being down the rocky bed of the Yangki River. No wood or grass obtainable.
21	Yangki	22	11,765	S	Halted near some underground huts occupied by shepherds from Khotan, in charge of cattle belonging to the kag. This is a famous grazing-ground, the grass growing to a height of two to three feet. The hillsides are covered with the wild yam plant, which is used as a medicine by the people of Central Asia. Wild goats, sheep and mules abound in this place here in large numbers. The road from Khablas to Yangki is very bad; for half the distance it runs on a rocky surface, and crosses over a large glacier and the Nam Kuan Dwan Pass height, 13,659 ft., the ascent to which is very steep. After crossing the pass, it runs over a small glacier, and descends very abruptly to H. g. The passes viz, the Yangki Dwan and the Nam Kuan Pass—are in the Khamtan range of mountains which are for the most part very rugged and steep, and are composed chiefly of loose shingle, with granite rocks above.
22	Kashgar	10	10,065	N.W.	Halted at a stone hut on the right bank of the Yangki River. The road is particularly rocky and dangerous, from passing over a succession of steep and rugged hillsides running down to the river from the plateau on either side, the bed of the stream is therefore very contracted. Large quantities of coarse grass and reeds found here.
23	Kashgar	16	8,735	N.	Village of about ten houses which are chiefly occupied by convicts and exiles from the cities of Kashgar, Yarkand and Khotan. The road for the

ROUTE I.—FROM LEN TO IRMI—continued.

Number of Marches.	Place.	Estimated Distance in Miles.	Height in Feet above Sea-level.	General Routing.	Remarks.
24	Pind.	13	8,643	S.	<p>first portion is very rocky, lying down the Bridge River. Poplars and other trees are very numerous, cultivation is carried on, but not to a large extent. This place is situated on some flat ground on the right bank of a large mountain torrent which flows from a snowy ridge in the west and is noted for the "jashin," a disease of agave stone prized by the Chinese, and which is met with in the stream. The inhabitants of this village are particularly anxious to travel, and show disrespect even to the officials of the country. The country is known by their beards being kept shaved, and their faces branded with round marks.</p> <p>Village of about 20 houses, situated in a broad ravine running from the east, with only a small stream of brackish water in it. There are no trees about the place, but a good deal of wheat and barley cultivation in the flat ground on either side of the stream. The road to Karamgatak crosses by a wooden bridge the Khotan River, which flows from the Khotan plain range, and is very deep and rapid. After passing over a very steep descent, the road goes over extensive grassy slopes inclining northwards, and descends gently to the village. No water to be had on the route. It is reported that a large quantity of salt is extracted from the water at this place, and exported into Khotan.</p>
25	Hid.	10	7,692	N.	<p>Village of about 100 houses, situated on a ravine very like that of the Pind. No trees, and only a little cultivation. This place is also a well known grazing-ground, thousands of sheep and goats belonging to Khotan are kept here. Road very good, passing over several low spurs composed mostly of clay and sandstone. The portion of country travelled over between Karamgatak and thus has the appearance of having been the bed of a lake.</p>

Village of about 30 houses, situated on a patch of flat ground on the right bank of the Sirisd stream, which contains but little water, and rises in the low hills to the south-east. The road crossed a low sandstone ridge, running east and west, by the Biché Diwán Pass (height, 10,418 ft.), and then down the rocky bed of the Sirisd stream to Yangi langar. The ascents and descents of the Biché Diwán Pass are steep, and the bed of the river is full of large rocks, which makes the journey very troublesome. A few fruit-trees and cultivation at this place, which originally was a post or guard-house of the Chinese.

Village containing 150 houses, situated on the right bank of the Sirisd stream, and at the foot of the last low range of hills to be seen in the direction of Khotan. Road good, along the flat ground on the right bank of the stream. On reaching Kumát langar the ground resembles the Sowalika, at the entrance to the Mohan Pass, the country to the north being a vast plain.

Village containing 1000 houses and a small bazar. It is situated in the plains, at a distance of 3 miles in a north-easterly direction from the Khotan River the water of which is brought down in canals, for the purposes of irrigation. The whole of the ground for miles round this village is well cultivated, and in many parts is wooded with fruit-trees of various descriptions. Road lies over a sandy soil, till within 3 miles of the village.

Capital of Khotan; a large town. It is on the left bank of the large river named after the province. The road passes the whole way through gardens, cultivation, and small villages, until it approaches Urangkash, when it follows the great street of the bazar, crosses the Khotan River, and leads into Ili-chi. The Khotan River is forded in three streams, which is a difficult undertaking when the river is high, as the water is then very deep and rapid. On arriving at Ili-chi, a traveller feels as if he had left the hills altogether, and was in the plains of Hindustan, especially when he looks around him and sees no hills in any direction, excepting on clear days, when the lower ranges of the Kín Lun are visible. The city of

26	Yangi langar ..	29	5,330	N.	Village of about 30 houses, situated on a patch of flat ground on the right bank of the Sirisd stream, which contains but little water, and rises in the low hills to the south-east. The road crossed a low sandstone ridge, running east and west, by the Biché Diwán Pass (height, 10,418 ft.), and then down the rocky bed of the Sirisd stream to Yangi langar. The ascents and descents of the Biché Diwán Pass are steep, and the bed of the river is full of large rocks, which makes the journey very troublesome. A few fruit-trees and cultivation at this place, which originally was a post or guard-house of the Chinese.
27	Kumát langar ..	5	5,795	N.W.	Village containing 150 houses, situated on the right bank of the Sirisd stream, and at the foot of the last low range of hills to be seen in the direction of Khotan. Road good, along the flat ground on the right bank of the stream. On reaching Kumát langar the ground resembles the Sowalika, at the entrance to the Mohan Pass, the country to the north being a vast plain.
28	Benilá	10	4,678	N.W.	Village containing 1000 houses and a small bazar. It is situated in the plains, at a distance of 3 miles in a north-easterly direction from the Khotan River the water of which is brought down in canals, for the purposes of irrigation. The whole of the ground for miles round this village is well cultivated, and in many parts is wooded with fruit-trees of various descriptions. Road lies over a sandy soil, till within 3 miles of the village.
29	Ili-chi	11	4,329	N.W.	Capital of Khotan; a large town. It is on the left bank of the large river named after the province. The road passes the whole way through gardens, cultivation, and small villages, until it approaches Urangkash, when it follows the great street of the bazar, crosses the Khotan River, and leads into Ili-chi. The Khotan River is forded in three streams, which is a difficult undertaking when the river is high, as the water is then very deep and rapid. On arriving at Ili-chi, a traveller feels as if he had left the hills altogether, and was in the plains of Hindustan, especially when he looks around him and sees no hills in any direction, excepting on clear days, when the lower ranges of the Kín Lun are visible. The city of

ROUTE I.—FROM LUN TO KOTU—continued.

Number of Marches.	Place.	Distances in Miles.	Time in Days (approx.)	Remarks.
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Heli contains about 10,000 inhabitants, most of whom are men of the country, the only strangers being Kashgarees and Cabulites, who are few in number and chiefly traders. It is a well known manufacturing town, and celebrated for its rich carpets, silks, and cloth, and for raw silk, which is very extensively cultivated in the gardens round the city, and in the neighbouring villages. The bazar of Heli, where a fair is held every Thursday, is situated to the west of the old Chinese mud fort and consists of a long street running east and west, with four lateral ones—the principal street being covered in with a roof of reed matting. The Khan of Khotan has shown some enlightenment the result of personal observation when travelling through Loda in 1863 in the way in which he has laid out his military cantonment, which is to the east of the fort. The lines for cavalry, infantry and artillery are separate from one another with distinct parade-grounds. The town of Khotan, the Chinese fort, and the cantonments are all embraced within a fortified wall, about 9 miles in circumference.

ROUTE II.—FROM LUN TO LUN, VIA THE KARAKORUM PASS.

Number of Marches.	Place.	Distances in Miles.	Time in Days (approx.)	Remarks.
1	Jald	4,126	21	Village of about 300 houses, situated on the right bank of a branch of the Karakorum river, this village is called all Jald. The new village, containing about 1,000 houses, is situated on the left bank of the same river, and is surrounded by a fortified wall, similar to the one round Heli. The

which a fair is held every Wednesday, is about a quarter of a mile in length, and runs from east to west; it is covered in with matting like the one in the Iliki bazar.

Village of 1000 houses, situated in a well-cultivated plain, and dotted with fruit-trees. On leaving the village of old Jábé, the route, after crossing a branch of the Kárákash River called Sirikni, by a wooden bridge, passes through the fortified village of the same name, and then over a sandy plain, along which small post or rest houses are met with at intervals of 3 miles, to Piálma. The battle of Piálma was fought on this plain in April, 1864, between the Khotanees and Andajanees, or Khokánees, about 3 miles east of Piálma. Numerous tombs mark the site of the battle-field, which is partly covered with long reeds and bushes. In this battle it is reported that 70,000 men were engaged on either side; that the Khotanees were the victors, and they captured 60 guns, 2500 prisoners, the camp and baggage of the enemy, including 600 camels, 2000 horses, and 1500 donkeys. I noticed a boat on the branch Sirikni of the Kárákash River near Jábé. It was constructed of poplar, and built by Kashmirees. It was twenty feet long, by twelve wide, and was flat-bottomed. Immediately to the west of new Jábé, is a chain of posts, or guard-houses, of the Chinese, running north and south. These post-houses extend from the hills to the south, to Akai to the north, and are at intervals of $\frac{1}{2}$ a mile; they defined the boundary line between the provinces of Yárkand and Khotan during the time of the Chinese rule, and were still such, until the battle of Piálma, when the Khán of Khotan advanced his boundary line to the town of Gúma.

Village of about 1500 houses, fortified in the same manner as Jábé. The village is situated in an open plain, near a small stream, which flows down from the spurs of the Kíun Lan range to the south. There is a good deal

w.

4,342

26

Piálma

2

w.

4,396

17

Zilgá or Zellingá

3

ROUTE II.—FROM ICH TO ICH, VIA THE KARAKORUM PASS—continued.

Number of Mesokala	Place	Estimated Distance in Miles	Height in feet above sea-level	General Description	Remarks
4	Sanja	23	6,134 w. & s.w.	A large but scattered village, containing about 7000 houses, situated immediately below the first low hills of the south in a open area, which comes down from a high range running east and west, and separating this portion of the country from that traversed by the Kerkash River. Sanja with its surroundings of Kherghiz sheepfolds, &c. is considered a <i>parwana</i> , and was supposed to have been until my visit in Khotan, when Beg, the beg, or governor, accompanied by the begs of Zikra and Guana, came to Khotan, and agreed to transfer the respective <i>parwana</i> to the Khan of Khotan. The road from Zikra lies over a sandy plain, sloping from south to north, void of vegetation, for a distance of about 12 miles, when it advances down a steep descent of about 300 feet to the ravine in which Sanja is situated. Extensive salt vegetation of wheat, barley and lucerne even is met with here, and numerous fruit-trees and small vegetable gardens containing turnips, radishes, onions, spinach, &c.	Between
5	Kivis	11	6,781	Village of 5 houses, inhabited by sheepherds (not Kherghiz) of Sanja. There being good grazing-ground about the place, large flocks of sheep and yaks from Sanja are met here.	
6	Pai	8	7,199	Situated on the Sanja ravine and sometimes used by travellers as a stopping-place, there are no houses, &c., here. Bunches of willow and juniper very numerous along the banks of the stream. The road from Kivis was very bad and the route rendered difficult owing to the ravine up which it runs being very confined, and the necessity of fording the stream very frequently, the bed being full of large boulders.	

A Karagha encampment and grazing ground situated near the junction of four small streams which are the source of the Saip River, and about 5 miles to the north of a narrow range, which is the watershed of the Karagha River on its western side. The ground about the place is covered with short, low grass, which is said to afford good pasture to the flat-headed sheep and yaks of the Karagha shepherds, who are found here in large numbers all the year round. These Karagha are quite independent and are reported to be great robbers. During the time of the Chinese, they always kept a guard of 50 men at this place, to prevent the natives leaving the country and to keep strangers from entering it, without due authority from the Khan Amban of Yarkand. Numerous chikoor are met with at this place.

Trading-ground used by travellers and caravans on their way from Yarkand to Ladak, and by Khazas shepherds. The road from Koramul has been for a distance of 2 miles over the grassy slope of a ravine, after which a steep ascent to the Walaqot or Saip Pass is to be made, and then descend down a ravine to this place, which is situated on the right bank of a stream which flows down from the range which is the watershed of the Karagha River on the north and drains into that river. The road over the Walaqot Pass is steep and rocky, and dangerous at the time of snow, from the circumstance of fresh snow having fallen, and which partially covered the horses and caravans in this place. The road at the top of the pass for about 60 feet on either side runs over solid rock.

Kharagha encampment situated on the left bank of the Karagha River, which flows through a broad valley. The road from Zakongers to Piktang-shan is found to lie down the stream, on which the latter place is situated, for a distance of 16 miles, till its junction with the Karagha River and then proceeding up the left bank of this river to the encampment. The whole of the country on this march is a grazing ground, used by the Karagha shepherds, who were very numerous until partially destroyed by Mian Abukar, a chief of Badakshan, who is reported to have invaded this part of the country about 80 years ago, to punish the Karagha for their

10,230

14

Korimtekjiga ..

10,210

18

Zakodgru ..

10,905

22

Piktangsh ..

ROUTE II.—FROM ICHI TO ICH, VIA THE KARAKORAN PASS—continued.

Number of Miles	Place.	Estimated Distance in Miles.	Height in Feet above Sea Level.	General Description.
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KARAKORAN.

depredateous on the Yarkand caravans. The ruins of two forts, and to have been erected by Abukhar, in 1651, one of which, (Hazar, height, 10,065 ft.) is at the junction of the Zakirgi's ravine with the Khotanish, and the other at a point from whence a road branches off to Yarkand from the Suji route. This road is not well known, but it is reported to be occasionally used by foot passengers.

10 Chul. 23 10,715 6. United near an encampment of Khéghin, on the left bank of the Khotanish River. This place is also used as a grazing ground by the Khéghin, and by the traders from Ichi, on account of the long grass, which affords a good pasture for the horses of the latter as to inform them to halt here several days to recruit their animals after the difficult journey over the Karakoram Pass. It is reported that the land about this place had been cultivated at some previous period by the followers of Mirza Abukhar, and which appeared to me evident, from the land being laid out in strips, resembling the fields on the banks of the Indus near Ichi. The road from Ichi to Karakoram is very good, being along the left bank of the Karakoram River. It passes the ruins of an old citadel, Mirza Abukhar, after the river from Khotanish, and which is situated at a point from whence a road leads to Yarkand. It then runs up a ravine for two miles, and then crosses the Karakoram Pass, which is situated about 10 miles to the north-west of the Wilegh Pass and on the same range, and passes down a ravine to the head of Khotanish, at which place the Chinese always kept a guard of 30 men to prevent strangers from entering the country by this route, which is one of the three principal ones to Yarkand from Ichi, but is not used in winter, owing to the pass being a high one. A caravan, it is said, can reach Yarkand from this place on the 6th day.

broad and open valley, called *Sorkhid*, from the soil of the country being of a red colour. Bushwood and grass are to be found in large quantities along the route. A new lands from *Slidula* to *Chigai* a junkle, situated on the higher range from *Leh* to *Yusung*. *Lauwag*, *Slidula*, it runs west up a ravine crosses the *Kangra* range. *Pass* eight, 10, 25 ft., which is on the same ridge as the *Wang* and *Kal* in snow and descends a ravine to *Kangra* range. Height, 10,25 ft. The route is very easy, laden carrels were brought over when I was at *Slidula*. It is not much frequented by traders, on account of its being dangerous from the *Slidula* and also the *Kangra* who are to be met with on the second night from *Slidula*. It is chiefly used by traders from *Yusung* to *Leh* proceeding by the *Kangra* route, as a means of carrying their goods and also by these robbers. After their goods have been plundered. These traders, as a general rule, abandon their horses, goods, &c. on the appearance of danger. The general appearance of the country is bare and rocky like that about the river *Indus* at *Leh*, with the exception of the hills being somewhat lower and there being less snow on them.

Halted at a place where the last patch of grass is to be found in the valley called *Suket*, and about 6 miles west of the pass of the same name. This valley is a grassy ground much used by traders from *Leh* to *Yusung*, as it is the first at which grass and wood are obtainable after leaving *Yusung*, and travelling over the barren ground about the *Kangra* range for 8 days. The route lay up the left bank of the *Kangra* River for a mile, to the point at which that river turns east, and then up the right bank of the *Indus* stream which rises in the ridge which is the western water-shed of the *Kangra* River.

Sakit .. . 20 15,400

12

ROUTE II. — FROM LEIN TO LEIN, VIA THE KAKAXAN PASS, CONTINUED.

Number of Marches +	Place	Estimated Days, or in Miles	Height in feet, above sea level	General Exposure	REMARKS
13	Malakshā	30	16,175	s.w.	<p>Halted at a spot used as an encamping-ground by caravans, situated on the left bank of a stream which flows down from the east, and is the source of the Kekar River, with, after joining others, runs down to the south. The Kakaxan road from the Kakaxan Pass to Yarkand starts from this place, and follows the course of the above stream, passing by grazing-grounds of Kadrakiz people, after which it crosses a low spur of the Kakaxan range by the Kekar Pass at the village of the same name, and thence to Yarkand. The road from Sakit runs up a ravine, at a slight ascent, for 9 miles to the Sakit Pass (height, 18,227 ft.) and then down a similar descent to Malakshā, passing an encamping-ground called Chikra, height, 16,439 ft., situated about 12 miles east of the Sakit Pass. I noticed some old ruins of mud huts at Chikra, which, I was informed, were built, as stables, by a chief of Yarkand, who, with a party of horsemen, many years ago entered the Nubra Valley, and plundered the Yarkand mountaineers who were subject to the Raja of Lach-Ni, west of grass to be had at Malakshā, where it likewise not about 10 miles from the end of October to end of April, in consequence of the streams being thickly frozen over.</p>
4	Balti Brānd	33	17,575	s.	<p>Halted under a rock used as a place of shelter by travellers, situated on the left of the sandy ravine which comes down from the Kakaxan Pass to the south. The route from Malakshā lay for 4 miles over the end of a lower spur running down from the east, and then up the stream, which comes down from the Kakaxan. The encamping grounds of Dobra Shergov, and Chupoch, are height, 15,200 ft., were passed at 10 and 23 miles at the former place a high grass was seen. By proceeding north across the hills from Balti Shergov, the Karakash it was may be reached in four days.</p>

Price (Sept. 1831), the ascent to which is easy, and then down a snow-drift to the Kulu Pass. The general features of the country after leaving Sahit are low barren hills and plains. Though the ground travelled over was almost a plain still this part of my journey was very difficult, owing to the country being under snow.

Halted at a small stone hut situated on the right bank of the Shok River, where wood and grass are to be had in small quantities. The road lay down the Kulu Pass, and its junction with the Shok, which flows down from the great Karakoram range to the west, and after crossing the river, follows its course along the right bank of the Shok River, at the time of crossing it, was only eight feet wide, and frozen over.

Stone houses erected last season by the Maharajah of Kashmir, situated on the left bank of a stream which flows down from the Sassi Pass, with a little wood and grass on either side of it. A route from Ladakh, passes some large glaciers, and lies down the right bank of the Shok River to the junction with the Shok, the present level stream, whence it ascends to Sassi. This route travelled over by me from Kulu, Kulu is called the "K. and the Shok," and can only be used in winter, when the water in the river is frozen. There is another route from Kulu, down to Sassi, from the Deopang Pass, but it is only used in summer on account of the cold, and the pass being very severe in winter. Numerous sheep and goat were seen near the mountain-ground.

Examined near some huts occupied by shepherds from Nidra during the summer, and situated on the left bank of the stream of the same name, which flows down from the Sassi Pass, and from which the stream of the Shok is formed. It is 10 miles to the north. The road over the Sassi Pass was difficult, owing to the heavy falls of snow part of a closing the sources

16 Gapsan .. 17

17 Samlor Sassi .. 22

18 Tashik .. 12

ROUTE II. FROM LEH TO LEH, VIA THE KANGKORAM PASS—continued.

Number of Marches	Place	Estimated Time in M. Day	Height in Feet above Sea-level	General Bearing	Remarks
19	Changlung	9		s s w.	in the glaciers, which are met with on the pass, and thereby rendering travelling dangerous. The snow pass is in the high snowy range of mountains which separates the Shiek from the Nobra River.
20	Paimuk	8		s w.	
21	Tagar	31		s	Village in the Nobra Valley, in the Ladak district. The road led down the Tachak ravine for 5 m. or there, crossed a low spur, and descended to the village, which is celebrated for its hot springs.
22	Chatt	7	10,676	s s.	Village in Nobra (district Ladak), this place is also well known for its hot springs.
23	Abarlong	10		s s.	Do.
					Do., situated immediately below, and to the north of the pass leading into Leh from Nobra. The road lay up a ravine after crossing the Nidra River, which was about 20 ya ds wide, but frozen over.
24	Leh	22		s w.	Do., crossed the Khardong Pass height about 19,000 feet, on which there was 3 feet of fresh snow.

ROUTE III.—FROM ILICHÍ TO KIRÍS.

	Ilichí to—			Described in Route No. I.
1	Dál	14	..	Village of 60 houses, situated below the end of a long spur from the Kín Lun range. The road for the first part was that pursued by me on my way to Ilichí from Besifá, as far as Urangkash bazar (height 4131 feet), after which it left that route and turned to the left, passing through cultivation and fruit-gardens the whole way to Dál. Irrigation is carried on at Dál by the canals which pass through the ground about Besifá.
2	Chirá	19	4,538	Bazar and town, containing about 3000 houses, is situated about 4 miles to the west of the river of the same name. The country travelled through to-day was like that between Ilichí and Dál. A fair is held in the bazar on every Tuesday, in which most of the articles manufactured in Ilichí are bartered for gold, which is mostly brought down from the mines to the east of Kirís, though small quantities are worked in the river near this place. On the route, I noticed that the desert of Taklá Makán skirted the vegetation, at a distance of about 3 miles, all along on the north.
3	Karákar	16	..	Village of 60 houses, situated between the Chirá and Kirís rivers. The road from Chirá to this place was lined with cultivation, &c., which is watered by canals from the Chirá River. This small river was forded about 7 miles east of the above-mentioned place.
4	Kirís	20	4,755	Town and bazar, containing about 7000 houses, is situated on the right bank of the river of the same name, and at a distance of 9 miles above its junction with the Chirá stream. This place, like Chirá, is surrounded with cultivation and gardens. In the bazar, which resembles that of Ilichí, a fair is held on every Sunday when the chief trade consists in bartering the cloth, carpets, &c., manufactured in Ilichí, for gold, which is brought down in large quantities from the mines to the east of this place. Kirís is much frequented by Kashmirees and Cabulees for the purpose of purchasing gold, which is reported to be cheaper and of a better quality at this mart

ROUTE III.—FROM LEH TO KATHA—continued.

Number of Stations.	Place.	Estimated Distance in Miles.	Height in feet above sea level.	General bearing.	Remarks.
					than at any other. The road from Kardkar lay over a sandy plain, till it crossed the Kama River, after which it passed through well cultivated fields. The Kama River, which rises in the eastern portion of the Kian Pan range of mountains, and flows north, is crossed by a wooden bridge when the water is low, but is forded at three streams in the summer months, the temporary bridges being carried away every season by the rains in the river occasioned by the melting of the snow in the mountains. Here at Chura, the Tokla Mahan desert is to be seen at a distance of 3 miles to the north. Its general appearance is that of a barren range of low hills. The soil and features of the country about Katha are very different from those about Heli. Only last season a new route was discovered from Katha to Leh, via Pajid village, which is situated about 14 miles southeast of this place, and higher up the Kama River. It is reported a horseman can get from Heli to Leh by this route in 14 marches.

ROUTE IV.—FROM KATHA TO YARRAK.

	Described in Route No. II			
1	Zigri to— Mudji	14	4,464	w.
2	Gama	10	4,229	w.

Village of about 60 houses, situated on a small stream which comes down from the Zangri River, some cultivation and a few fruit-trees are to be seen. The road from Zigri lays over a barren plain the whole way.

Small town, situated on the Sanju River, and about 30 miles north of Gama village. Contains a bazar, where a fair is held every Monday, and about 60-80 houses, all of which are enclosed by a fortified wall, like that round

still, on account of the Yarkandees being prevented by the invading Khokanees from visiting this place. The only persons that carry on a little trade are the Kashmirees, of whom there are only a few in the bazar. Extensive cultivations of grain of various kinds is carried on, both inside and outside the fortified wall. The road from Mánji lies over a barren plain, void of vegetation, with the exception of a few fields about the village of Chunar, which is 9 miles from Mánji.

Village of about 100 houses, situated on a small stream which flows from the south; extensive cultivation about the place; also a few fruit trees. The village belongs to Yarkand. The road from Gúnd lies over a sandy plain, in which situated tamarisk-bushes were met with occasionally. The small village of Chúlak, consisting of 6 houses, was passed at 12 miles.

Town and bazar belonging to Yarkand. Kasgalik is situated at the point where the various routes from Leb and Ikté to Yarkand unite.

Bazar.

Town and bazar.

City. Yarkand River to be crossed about a mile to the south of the city. Yarkand is reported to contain about 120,000 inhab tants, composed of natives of Khokan, Badakshán, Kuchár, Cabul, Baluchán, and a few Hindostanees. The city is divided into three portions, viz: the Mahomedan town, Chinese town, and Chinese fort and cantonment. Mahomedans were not permitted to enter the two latter during the time of the Chinese.

3	Lák	26	4,152	w.
4	Kargalik	6	4,118	w.
5	Eshambá	12	..	w.
6	Poshgóñ	6	..	w.
7	Yarkand	12	..	w.

Derived from Native Information.

ROUTE V.—SANJU TO KARGALIK (DERIVED FROM NATIVE INFORMATION).

Number of Marches.	Place.	Estimated Distance in Miles.	REMARKS.
	Sanjú to—		
1	Búra'	48	Pass Bitorgák and Kushták villages.
2	Kargalik	19	Town.

ROUTE VI.—SANJU TO KARGALIK, VIA KALIÁN (FROM NATIVE INFORMATION).

	Sanjú to—		
1	Kalián	40	Village.
2	Búrá'	17	Do.
3	Bisharák	17	Do.
4	Kargalik	18	Town.

ROUTE VII.—KIRIÁ TO CHACHAN AND LOB (FROM NATIVE INFORMATION).

	Kiriá to—		
1	Usalún langar ..	16	A post-house.
2	Nia	17	Village, 50 houses.
3	Kumrábád langar	16	10 houses.
4	Khadálák	20	Encampment and gold mine.
5	Akmárán	17	Do. do.
6	Kukmárán	16	Do. do.
7	Egar	19	Do. do., and well.
8	Chákalák	17	Grazing-ground.
9	Cháchan	16	Village, 500 houses, and cultivation.
10	Encampment ..	20	Shepherds' tents.
11	Do.	21	Do.
12	Do.	18	Do.
13	Do.	17	Do.
14	Do.	16	Do.
15	Lob	20	Village and lake (large, with fish in it.)

ROUTE VIII.—ILCHI TO SHADULA, VIA THE HINDO TAK DIWAN PASS
(FROM NATIVE INFORMATION).

Number of Marches.	Place.	Estimated Distance in Miles.	REMARKS.
	Ili to—		
1	Largong	15	Village.
2	Papúá	16	Do.
3	Olgiá	15	Do.
4	Mitak	15	Shepherd encampment
5	Chách	16	Village.
6	Nisé	19	Do.
7	Kará	12	Shepherd encampment.
8	Pushú	16	Khérghiz encampment.
9	Mazár	16	Do.
10	Halting-ground	24	Right bank of Kárákash River; after crossing the Hindo tak diwán Pass.
11	Do.	20	Left do., do.
12	Do.	24	Left do., do.
13	Shádulá	28	Vide Route No. II.

ROUTE IX.—MALAKSHA TO KARGALIK (FROM NATIVE INFORMATION).

	Malakshá to—		Vide Route No. II.
1	Káfilúng	18	Encamping-ground.
2	Imbulgár	18	Do.
3	Khérghiz jungle	24	Do.
4	Yangí diwán ..	12	Do.
5	Túrúgil	12	Do.
6	Dóbá	15	Cultivation.
7	Túklák	30	Do.
8	Ak Masíd	22	Encampment of shepherds; crossed Tokí diwán Pass.
9	Kuglár	18	Village and pargana.
10	Behtúrák	15	Village.
11	Kargalik	11	Town.

ROUTE X.—ABUKAKAR FORT TO KALLAN (FROM NATIVE INFORMATION).

Number of Marches.	Place.	Estimated Distance in Miles.	REMARKS.
	Abúkakar Fort to—		<i>Vide</i> Route No. II.
1	Dúra	12	Encamping-ground of Khérghiz.
2	Bostán	13	Do. Cross Kallán Pass.
3	Chadartásh ..	16	Do.
4	Katái Tám ..	■	3 towers and post-house.
5	Upálák	20	Village.
6	Kallán	25	Village and pargana.

ROUTE XI.—YARKAND TO AKSU (FROM NATIVE INFORMATION).

	Yarkand to—		
1	Achtákú	10	Village.
2	Lailák	14	Do.
3	Mainák	14	Do.
4	Alagák	12	Do.
5	Akmarálá	13	Do.
6	Shímál	14	Village.
7	Lál Masíd	15	Small town.
8	Chérwásh	13	Village.
9	Tanshoká	17	Do.
10	Chadarkúl	14	Do.
11	Yákákodák	12	Do.
12	Sogat	12	Do.
13	Chalán	10	Do.
14	Saíortáng	12	Post-house.
15	Kumbásh	10	Village on the high road from Yárkand to Pekín.
16	Aksú	10	Town and fort.

ROUTE XII - YARKAND TO KASHGAR (FROM NATIVE INFORMATION).

Number of Marches.	Place.	Estimated Distance in Miles.	Remarks.
	Yarkand to—		
1	Kukarabad ..	19	Small town.
2	Kizil . . .	18	Do.
3	Yangshahar ..	18	Large town.
4	Kashgar ..	18	City and fort. Kashgar was a small province of China till the late rebellion, when it became independent, and has since been governed by a person called Khoja sault. The city, which is situated on the road from Yarkand to Khotan, is said to contain 50,000 inhabitants, and is much frequented by Khergis and pherds from the hills to the west. The fort is reported to be a strong one, and the Chinese are said to have held the place against the Mahomedans for thirteen months after Yarkand was surrendered.

ORTHOGRAPHY OF NATIVE NAMES AND WORDS.

The following rules have been observed in spelling the native names and words which occur in the foregoing papers, except in the cases of well known places, whose orthography, as established by custom, has been adhered to:—

The first vowel sound in	<i>mama</i>	will be indicated by	<i>a</i> .
The second	"	"	<i>ä</i> .
The vowel sound in	<i>any</i>	"	<i>e</i> .
"	<i>dei</i>	"	<i>i</i> .
"	<i>hit</i>	"	<i>ä</i> .
"	<i>deep</i>	"	<i>ä</i> .
"	<i>haya</i>	"	<i>o</i> .
"	<i>etä</i>	"	<i>o</i> .
"	<i>full</i>	"	<i>u</i> .
"	<i>rule</i>	"	<i>ü</i> .
"	<i>fume</i>	"	<i>ü</i> .
"	<i>ripe</i>	"	<i>ai</i> .
"	<i>foul</i>	"	<i>ou</i> .
The nasal sound of	<i>n</i>	"	<i>ñ</i>

The letter *c* will always be used to indicate its soft sound as in *centre*; and *y* will be employed for the hard sound of that letter as in *gate*.

II.—*The Physical Geography and Climate of the Colony of Natal.*

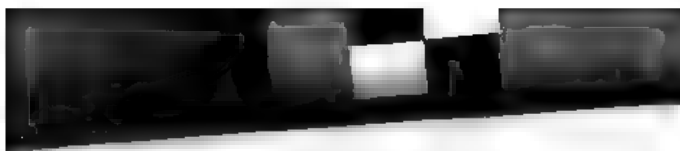
By ROBERT JAMES MANN, M.D., F.R.G.S., F.R.A.S., Superintendent General of Education in Natal.

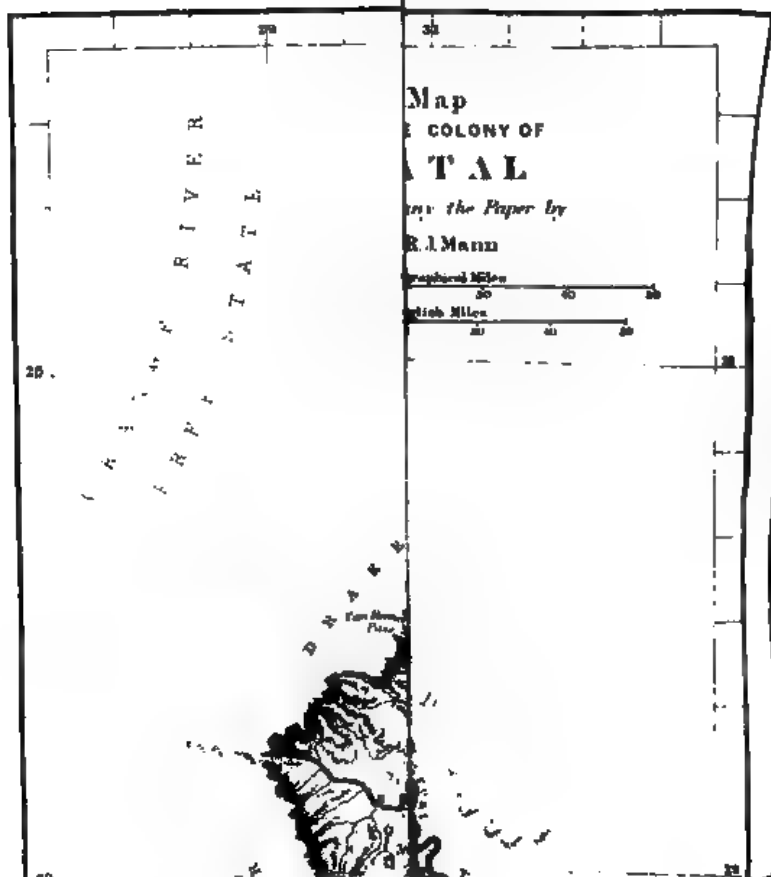
Read, November 26, 1866.

THE Colony of Natal lies on the Eastern Coast of South Africa. It is about 800 miles beyond the Cape of Good Hope, and is included between the 27th and 31st parallels of south latitude. It is a small land, having an area not exceeding one-third the area of England; but it occupies a very important and interesting position as being the focus and centre, and therefore the type, of what Dr. Livingstone, and others, have termed "the Kaffir zone" of South African climate.* It has a sea-coast of 150 miles trending from south-west to north-east, and looking out into the Indian Ocean. The lower, or southern, half of this coast has a range of mountains lying parallel to it at a distance of about 100 miles, and thus forming the opposite or inland frontier of the colony. Farther north this mountain frontier bends back into a kind of hollow bay, with a sharp angular extremity, which is 40 miles farther from the sea. The so-called mountains are, however, properly a ledge, or step, rather than a ridge. They are the first abrupt descent by which the main central table-land of the great continent subsides towards the sea-border. The face of the step, looking towards the colony, is a bold and buttressed wall several hundred feet high; whilst, on the other side, the abrupt barrier makes a very trifling dip to the high plains of Basuto-land and the Orange River Free States. The crest of this ledge is generally between 5000 and 6000 feet above the sea; but its higher peaks and jags rise to between 7000 and 9500 feet. The extreme northern corner of the colony, where the Buffalo River comes out from the inland mountain frontier, is within about 200 miles of the southern tropic. The entire land is therefore sub-tropical;—that is to say, it possesses the leading characters of a tropical climate in a subdued and pleasantly softened degree. In actual size the colony comprises 17,000 square miles; or, in other words, 11,000,000 of acres of land.

From the salient point of the Drakenberg Mountains, where the barrier begins to retire to form the bay already described, there comes forth a subordinate mountain ridge, which crosses the middle of the colony as a high central back-bone, stretching north-eastward until it almost strikes the river frontier in that

* See Wilson's Paper on "Water Supply in the Basin of the Orange River," *Journal*, vol. xxxv. p. 106.





direction. This ridge is fingered towards the sea, and between the fingers separate rivers drain down. There are five fingers, and there are four main grooves or rivers which are respectively known as the Umvoti, the Umgeni, the Umhlati, and the Ilwoti. The extremities of the fingers are also split into yet smaller cracks, out of which issue thirteen other lesser rivers. Further south a somewhat similar state of things is encountered; but the main ridges there come direct from the Drakenberg, instead of from a central secondary offset. The chief ridges in this direction are between the Umkumungu, Umzimkulu, and Umfankomo rivers; but there are also subordinate fingers, and subordinate streams, so that there are altogether about fifty distinct rivers, large and small, opening out each by a separate mouth along the 150 miles of coast. The traveller who rides along the land near to the coast is always either climbing up out of a water-course or descending into one.

The coast is everywhere comparatively low. There the hills range from one to three or four hundred feet in height. On the sides of these hills, and in the valleys lying between, sugar, coffee, arrowroot, and most other plants of tropical habit and constitution, grow and thrive. The coast counties of Victoria, Durban and Alexandra, are now the seats of considerable industrial activity. There are now sixty-three sugar-mills in operation in this district; and the year before last there were produced in it 7000 tons of sugar, 62,000 pounds of coffee, and 115 tons of arrowroot. In leaving the coast the ridges of the land rise higher and higher, until at the distance of 70 miles from the sea, on the great central back-bone already alluded to, the main road lies 5400 feet, or rather more than one mile, high; and the summits of the surrounding hills have a still loftier elevation. In climbing this slope, the tract where sugar and coffee can be grown, and where the pine-apple and banana ripen, is left at a distance of about 16 miles from the sea, and a region of green hilly pastures is entered upon, where cattle and horses thrive, and where wheat and oats, the potato, and many of the food-crops of Europe, can be advantageously cultivated. On the tops of the hills of the central districts sheep are now becoming abundant, and doing exceedingly well. In the year before last there were in Natal, in round numbers, 290,000 head of cattle, 170,000 sheep, and 15,000 horses. In order that the correct meaning of these numbers may be apprehended, it must be understood that the land has only been an European settlement forty years, and a British dependency twenty years.

In Indian corn and tobacco grow everywhere, both on the coast lands and in the uplands, in the utmost luxuriance.

The northern division of the colony, which lies beyond the great central back-bone, whereas descent the two Tugela and four rivers, is one broad watershed or basin, coming out from the rising lay of the Drakenberg already referred to, and having its streams all gathered together at the north-eastern frontier of the colony into one common outlet or channel, which then runs through a course of about 10 miles to the sea, and is known as the Great Tugela River, a frontier river all the way. The central branch of these upper tributaries of the Great Tugela is still called the Tugela, and comes out from the north of the retiring plateau lay of the Drakenberg, by a wide broad lay of more than 2000 feet perpendicular height. The other tributary branches of this water-system are the Mgeni River, which collects from the south along the northern slope of the great central back-bone and the Buffalo River, which collects from the north and is there the frontier of the colony in upward continuation of the Great Tugela. The northern district is thus a rhomboid space, included between a western mountain-tops and an eastern river-tops which touch at their divergent points, and this space contains the so-called Upland Counties of Western, Kip River, and Newcastle. The river confluents which lie between the Northern Buffalo and Central Counties are the Sunday and the Kip rivers. The confluents which lie between the Southern Mgeni River and the main channel are the Rushman, the Blau Krantz, and the Little Tugela rivers. Thus, then, in advancing inland in Natal from the coast, along the main line of road, the traveller, who has climbed for 70 miles, dips down into a broad basin, and does not ascend so high again until after passing all the confluents of this river-system, he mounts the actual wall of the Drakenberg. The hills in this broad valley are high toward the Drakenberg, and resemble the more elevated grounds of the central back-bone towards the confluence of the rivers the valleys are comparatively low, basin-combined and warm. This is so much the case that at Wessem, down toward the mouth of the Rushman's River, and 70 miles to the north of Maritzburg, the orange ripens as perfectly and as readily as it does on the coast.

A very interesting feature of physical geography is involved in the contrasted characters of these two several divisions of the colony of Natal, the Northern one-river basin, and the Central many-river basin. The first, it will be remembered, issues from the great retreating angle of the Drakenberg frontier; the other hangs upon the great salient angle of the Drakenberg, which it may be here stated stands boldly out into the colony as a buttressed and battlemented mass, and is widely known as a prominent object in the landscape under the name of "The

Giant's Castle." The distribution and disposition of the Drakenberg is indeed the obvious cause of this contrast. The inward fold of the Drakenberg, in the region of the returning angle or bay, has caused all secondary disturbances and ridges to converge towards a common point or focal centre, where gaps just large enough for the escape of the waters of the basin-area have been left or worn. The backward bend of the Drakenberg, on the other hand, has caused the secondary disturbances and ridges to *recede* from the same point like the fingers of a hand or the spokes of a fan. Where the great mountain-line folds in the watershed is convergent and the river-system concentrated. Where the great mountain-line bends back, the watershed is divergent and expansive, and the river-system many-mouthed. Natal is properly but the narrow rim of the great African table, irregularly levelled towards the sea. The general plan of the craning of this rim is ribs running outwards with water draining down to the sea between the ribs. But in one place the rim itself has been converted into a zigzag, and here the ribs have been squeezed convergently in the hollow of the distortion, and expanded radially from the prominent points. Hence Natal has its great northern basin of the Tugela, draining nearly everything of the area of the colony into one vast river; and its coast district fringed by fifty distinct streams, which drain the other portions.

The central high back-bone of the colony lies in the fine pastoral and agricultural counties of Maritzburg and the Umvoti. The coast portion of the fingers of this back-bone composes the counties of Victoria and Durban. The southern district, which lies beyond the fingers of the central highland, and which may be spoken of as the final division of the colony, contains the coast county of Alexandra, and the least settled portion of Maritzburg County, that which is beyond the Umvotiing River, a district that before long will have to be erected into a distinct county. Until within the last few months the large River Umvoti, a Drakenberg-fed stream, was the ultimate boundary of the colony towards the south-west. But now a coast-strip beyond, which was a portion of the territory formerly known as No-man's-land, has been annexed to the colony under the style and title of Alfred County, and the frontier on the coast has been pushed on to the Umtanfontein River, the streams feeding the Umtanfontein still remaining the frontier in the higher region. The upper part of this No-man's-land district is held by the Griquas of A Lam Hoo, who has settled there under the patronage of Her Majesty's High Commissioner.

Through out the colony, the narrow ridges of the land which are composed within the great one-river basin, or forming part of

broad and deep lagoons, filled with water that is often brackish from the breaking of the sea at high tide over the sand-bars. The larger rivers, the Tugela, Umgeni, Unkomangi, and Umzimkulu are open at all seasons, with partial sand-bars, but with water channels large and deep enough for the passage of boats of a few tons' burthen. But the mouths of the channels are intricate and rock-cumbered. A small steam-boat has been taken into the Unkomangi, and some slight works have been undertaken to improve the entrance of this river.

The green hills of Natal are nearly everywhere moulded in granite, trap, or sandstone. These several rocks are mingled in almost inextricable confusion. The trap continually breaks through the older rocks, and especially the sandstones, and overlies them in vast swelling and spreading masses. The tops of many of the hills are expanded surfaces of bare trap-rock, scattered with huge stones of the same material, seemingly separated from the general mass in a semi-plastic state, and yet water-worn.

The Kip River (Stone River) takes its name from passing through stony districts of this character. The sandstones are continually battered, and grooved through by the rivers. Some of them are of the old large-grained Sclerian type, in very large masses; others have the character of excellent building free-stones. The peculiar table mountains, so well known as characteristic of the South African districts, are vast tables of Sclerian sandstone, 100 or 200 feet thick, and 3 or 4 miles broad, reared up on battresses of granite or gneiss, which slope out from beneath the tables as grass-covered ridges. The perpendicular faces of the sandstone tables are bare, horizontally-ledged rock, which lights up very brilliantly in the rays of the declining sun. These table-mountains lock down into grand ravines and valleys many hundred feet deep, with a silver streak winding away in sight for miles at the bottom. They are, however, portions of the general system of ridges, slightly notched out, or perhaps somewhat reared, from the rest of the range. This is well illustrated in the case of the very beautiful Table Mountain which is visible from the city of Maritzburg towards the east. The Table Mountain is simply the termination of one of the subordinate fingers which comes down from the Giant's Castle through the Spioenkop, and through the fine range of hills looking down upon Maritzburg from the north, lying in the fork where the Umgeni River, which lies to the north of this range, is joined by its tributary, the Umsundusi, the river of the city of Maritzburg.

The surface of the rock foundations of the land, the granites, traps, and sandstones, are in very many places unaltered and

vaneered by shales, which, in some instances, almost pass into the condition of true slate. The hardened beds of the old formation are in their turn disintegrated by the agency of the atmosphere, and of most energetic vegetable life, and so transmuted into more or less fertile surface soil, not unfrequently rich in humus. The shales are in general unsuited for building, especially for the construction of foundations laid beneath the ground.

As a general rule, the granites and gneisses occur most frequently within 10 or 50 miles of the coast, and shales and fossiliferous sandstones, perforated and overlaid by trap, are most abundant in the northern districts, and especially in the basin of the Tugela. A species of amygdaloid or claystone porphyry is also not unfrequently associated with the granites, gneisses, and Silurian sandstones.

True Limestone is very rare in Natal. It has been found in large continuous masses beneath the soil in one or two places, as for instance near the sources of the Ban Kreuz, in the county of Weenen. But within the last few months a very magnificent bed of crystalline limestone, in pieces almost rivaling Carrara marble in excellence, has been discovered on the River Umhahlala, partly in the new Alfred county, and partly in Alexandra county, and within hundred miles of the coast. This mass is estimated to cover an area of 20 square miles in extent, and at one spot the river passes beneath a precipitous wall of white marble 1000 feet high.

There are very large deposits of fine bituminous coal in the great basin of the Tugela. This coal has been seen on the surface in many places where the channels of the rivers are cut through it; and the waggoners stop as they pass, and fill a few sacks to take away with them and sell to the blacksmiths in the towns. The beds are of considerable thickness; but the actual extent of the coal, and the connexion of the several masses, has not been yet determined. Carboniferous shales, which give the lustre and aspect of coal, and easily take red heat by a strong fireblast, crop out in other places, as in the Umvoti, and on the coast on the Umhahlala, 50 miles to the north-east of Durban. Ironstone of various qualities is very abundant in all directions. It is dug out in nodular masses of from 1 to 2 feet across from beneath the surface soil of most of the gardens in Maritzburg. An ore found in Umvoti county, almost malleable in its crude state, has been known to the Kaffirs for a very long period, and richly worked by them. Fine ores of copper have been also recently discovered near and beyond the south-west frontier.

The coast of Natal is for the most part rock-bound. Granite, sandstone, trap, and basalt, alternate with each other in various

ing provocation to the surge. In places stretches of fine compact sand alternate with the rocks. Near the mouth of the Umzimkulu there is a very beautiful tract of columnar basalt exposed upon the beach. Further south, in No-man's-land (now Natal county), there is one region where the granite rocks closely resemble the rocks of the Island of Jersey. They are of great diversity of colour, and intersected by walls of black basalt, and present a very bright and beautiful appearance when the sea-spray is breaking over them in the almost tropical sunshine. The sandstone rocks are commonly scooped into hollows and basins, which are kept filled by the sea-spray, and thickly inhabited by penguin colonies of all kinds of shelled Molluscs,—*Cypræ*, *Acrida*, *Volutes*, *Trochus*, *Murex*, and the rest. At the extreme south-western boundary of the colony, near the mouth of the Umzimkulu, and more particularly between it and the Umzimba, the second river beyond, there is a remarkable fossiliferous bed, laden with *Ammonites*, *Trigonia*, *Terebra*, a large Univalve allied to the *Cornatza*, and containing Belemnite-like Murex, probably of the genus *Pinna*, between 2 and 3 feet long. It is quite impossible to get these murex out from the matrix. They can only be seen in situ, in caves that have been washed out by the breakers in the surf. The limestone has a transversely laminated structure, like that of the *Lagerström* of the earth. At low water a large pavement, studded with these fossils, is exposed along the beach. The rock is a limestone, seemingly of the Cretaceous period.

The inner bay of Natal is one of the most interesting possessions of the young colony, and is remarkable as being the only land-locked harbour along many hundred miles of inhospitable coast. It is a shallow tidal basin, about 4 miles long, with deep water-channels, and sheltered to the south-west by a grand bluff and hill-range above 200 feet high, and to the south-east by a low dune of blown sand, which is piled up along the sea-beach from the entrance of the bay to the mouth of the River Umzimba at a distance of about 4 miles. The bluff-range itself has obviously at some former time been an outlying island, as it subsides entirely towards the River Umzimba, and leaves there a tolerably broad sea-gap. The bluff-point and the Sand-spit approach each other from opposite sides at a broad angle, and leave between them a water-channel, into the inner bay, which is crumpled by a shifting sand-bar. Two small insignificant streams of fresh water drain into the bay. The sea is mainly due to the influx and reflux of the sea, and to the large area of the basin. The tide rises and falls 6 feet, and a considerable portion of the bay is dry at low water. The ships lie at anchor in a deep channel just within the rocks

tion of the Bluff. Ships of 500 and 600 tons' burthen enter easily at times of high tide; but the bar is subject to alternate fits of kindness and ill-humour. Works, under a plan of Captain Vetch's, were commenced some time since to enclose the seat of this bar in a large outer basin formed of wooden frames laced with stone. One of the piers now stretches out about a third of a mile into the sea; but the works are in a state of temporary suspense, on account of a difficulty with the contractor.

The interesting point, physico-geographically, in connexion with this bay is that it is altogether an external appendage, and, so to speak, after-thought of Nature. Inland of the basin there is a fine range of bush-covered hills (the Beres), 560 feet high. This is obviously the old and proper line of coast, continuous with the rest of the coast northwards. But the coast-hills from the south (the Bluff Hills) stand out further to seaward, and overlap this, so that a gap, quite open to the north-east, is left between. A ship in the north-east, 3 miles out to sea, off the mouth of the Ungent, looking south-westwards, would have the mouth of an open valley formed by the Beres Hills on the right hand, and the Bluff Hills on the left hand, before it. The mouth of this valley has been barred by blown sand, except just under the point of the Bluff, and even there the bar is continued under water. The space within and between the two hill-ranges is now partly shallow water, and partly a dry sand-flat, raised about 20 feet above the level of high water. The sand-flat is the little plain upon which the town of Durban has been built, and the water is the land-locked harbour or inner bay. The drifting along of the sand in the sea-currents, the rolling of the breakers, and the overlapping position of the Bluff Headland, have gradually issued in the formation of this harbour, with its low sandy outworks and barriers.

Thus, then, the colony of Natal is, in the main, an inclined slope of land 150 miles long, with a gradient of 1 in 70, looking out to the sunny Indian Ocean, in parallels of south latitude nearly tropical. The rapid slope and considerable elevation of portions of the land confer upon it diversities of climate that enable the productions of temperate and tropical regions of the earth to be successfully reared. But this does not complete all that has to be recorded in praise of its climate. Another consequence follows from the arrangement of this landscape, looking out to the Indian Ocean in nearly tropical parallels; the fact, namely, that the land is abundantly supplied with water, and that the greater part of this abundance falls in the season of summer, rather than in the season of winter. The streams of Natal never dry up, but they are swollen during the period of greatest

heat: and at their lowest during that of greatest cold. The summer in Natal is a season of frequent heavy rain, and still more frequent cloud: hence the heat never assumes the almost tropical fierceness which it would otherwise do in such close neighbourhood to the tropics. The summer heat is tempered by cloud-screens and constant evaporation. The winter in Natal is a season of almost constant gentle and June-like sunshine. This is exactly the opposite of what obtains at the Cape of Good Hope. The summer there is the season of scorching and drying heats, and the winter the season of wetness and cold. The reason for this remarkable and beneficial peculiarity has now to be explained, and the peculiarity itself followed out in detail by the light of deductions made from eight years' close and incessant study of the meteorology of Maritzburg.

Natal lies in a region of the earth that is naturally within the influence of the great south-eastern trade-wind set of the atmosphere for at least a considerable portion of the year. But this natural inclination of the air to move from the ocean to the land is greatly reinforced on the coast of Natal by another agency, which is yet more constant and more powerful. The nearly vertical sunshine falls upon the landscape for the greater part of the year, with a force that rapidly heats the superimposed air, and expands as it heats, until the thin air is driven back before the advancing stream of heavier atmosphere that flows forward from the comparatively cool surface of the Indian Ocean. This deduction is not a matter of hypothesis. It is a result of direct observation. For instance, during 1865 evenly spaced observations made at Maritzburg last year, the wind was blowing *in* from the sea 520 times, and *out* to the sea 145 times.

Now, when the sea wind comes in upon Natal from the broad sweep of the Indian Ocean, it is necessarily laden with pretty nearly as much invisible vapour as it can carry. With this burthen it rushes along upon the land, and as it rushes it glides upward up the slope which has been described. Before long it has made an inland journey of 70 miles, and is 1 mile high. It then finds itself freed from about a sixth part of the load and downward pressure which it sustained at the sea-level. Being freed from this pressure it expands, and becomes intrinsically rarer; and being rarer, it is incapable of supporting its original burden of vapour. Accordingly, the vapour first gathers as mist, then thickens as cloud, and finally deposits as rain; the deposit being accompanied by electrical disturbance and thunder. After a time this disturbance so drains the air of its superfluous moisture that the atmosphere clears, and the sunshine resumes

its fervent way; when the same state of affairs is brought back, and the same course is again entered upon.

Maritzburg, the capital of the colony, stands about two-fifths of the way up the slope, 40 miles in a direct line from the sea, and 2000 feet high. The observatory at which the meteorological observations were made is placed in $29^{\circ} 36' 13''$ S. latitude; and $30^{\circ} 1' 34.5''$ E. longitude, and is 2095.674 feet above the Custom House at Durban, which is just above the high-water level of the sea. In Maritzburg 40 thunderstorms occur during the six hottest months of the year; and lightning, indicative of a thunderstorm near at hand, is seen on ten other days. Thus, during this season of greatest heat there are thunderstorms on nearly each third day; and during a considerable part of the season there is rainfall on each second day. It is thus that summer heat in Natal is so remarkably tempered by the combined influence of the cloud-screen and the frequent watering. Almost every day in summer getselsonly seen after noon, and the clouds continue to shroud the sky and screen the ground until far into the night, when the sky clears, and the stars come forth. Unless on the exceptional occasions, to be hereafter alluded to, when the hot land-wind blows in force, the summer temperature of Maritzburg does not rise above 84° or 85° of Fahrenheit's heat-scale. In the last year there were only twelve days on which the temperature rose above 90° .

The highest, the mean, and the lowest temperatures of each month for the six hottest months of the year, deduced from observations through a period of eight consecutive years terminating with 1865, were—

	Highest.		Mean.		Lowest.
October ..	91.00	...	75.5	...	45.2
November ..	91.2	...	77.1	...	46.2
December ..	91.5	...	78.4	...	47.2
January ..	92.0	...	79.4	...	47.8
February ..	92.1	...	79.8	...	48.8
March ..	92.8	...	80.7	...	49.0

It will be observed here that, although the extreme temperatures are liable to occur in any of these months, the mean of any one month never rises to 72° ; and that the range of the mean for these six months scarcely exceeds 5 degrees. The mean temperature for the six summer months is 69° . The night temperature in these months rarely descends to 52° , and never goes below 42° .

In the winter months the sun shines with less intensity upon the soil, and consequently the sea-breeze currents and the atmospheric up-cast are less violent. A steady sea-wind blows; but this wind is more rarely broken by thunderstorms. Only

ten thunderstorms occur in Maritzburg in the six winter months of the year, and these fall at the beginning and end of the season, which must be looked upon as periods of transition. It likewise happens that as *the summer* is the season of frequent cloud and thunderstorms, *the winter* is the season of comparatively unbroken sunshine. In the last year there were at Maritzburg only twenty-one days of unbroken cloud during the six months of winter, and there were forty-nine in which the sunshine was uninterrupted through the day, the rest of the time being days on which sunshine greatly preponderated over cloud. The rule in winter is that the sun breaks forth in splendour soon after its rising, if it be not clear from the horizon, and that the temperature mounts rapidly to somewhere between 70° and 80°, so that only light clothing can be worn in the midday of even this period. The temperature then falls so low in the evening and at night, as to make a wood-fire pleasant, although not indispensable, to healthy and hardy men. On the coast a fire is not fit, excepting for cooling, at the year round; and, in many places in the uplands, people who have strange peculiarities never think of a fire in their sitting apartments. Indeed, the rule in the colony still is to build rooms without fireplaces; although this is a rule which will certainly be departed from as the settlers grow more wealthy. In journeying at this season the traveler rolls himself up in his tented waggon, at dark, in blankets, and rises at the first dawn of day to find himself warmed generally at Nature's own fire, by the time his messsair toilet and his first arrangements for the business of the day are completed. The fresh cool daybreak under canvas and the early basking in the first smart rays of the rising sun, at the tent door, are certainly among the prominent delights of a Natal residence.

The highest, the mean, and the lowest temperatures of each month for the six coldest months of the year, deduced from two observations of equal consecutive years, were —

		Highest.		Mean.		Lowest.
April	.. ..	84.2	.. ..	66.8	.. ..	46.2
May	.. ..	80.2	.. ..	63.3	.. ..	32.4
June	.. ..	84.2	.. ..	59.2	.. ..	32.0
July	.. ..	82.2	.. ..	59.2	.. ..	23.0
August	.. ..	80.8	.. ..	56.7	.. ..	34.8
September	.. ..	80.1	.. ..	60.1	.. ..	38.5

It will be observed here that there is no month in the winter in which the temperature is not liable to rise to 78°, and that the range of the mean of these six months extends to nearly 1°. The mean temperature of the coldest month is above 57°. The mean temperature for the six winter months is 56°. On the severest nights the temperature only just dips below the freezing-point. In a period of eight years the temperature at

Maritzburg has only been five times below freezing, and three of these five occurred on three consecutive nights in the month of July, 1864. In the last year there were only eight days during the six winter months on which the temperature did not rise to 60°; only twenty-three nights on which the temperature fell below 40°, and only two nights on which it fell to 36°.

One direct consequence of this coincidence in Natal of the period of greatest heat with the period of greatest moisture is the wonderful luxuriance with which the land is clothed. As the visitor sails along the coast from the Cape to Natal, he finds himself suddenly entering a new region of greenness. The impression made on the Cape colonist, when he first visits Natal, is almost invariably akin to that which is experienced on going suddenly into a well-kept garden. The same feeling is awakened in a degree even on crossing the Umzimkulu, near the coast, into the old territory of Natal.

The extreme range of temperature, during eight years was limited to 68-60°. There is considerable vicissitude, and to this vicissitude, indeed, much of the healthiness of the climate is due. The frequent relief from great heat makes the general high range of temperature much more endurable than it would otherwise be. The change also introduces an element which may become harmful under certain circumstances, that, namely, of chill after exposure of the living frame to a high temperature. Most sicknesses in Natal occur in the cold period following on great heat. I have no doubt that the so-called Natal sores are produced by the depressing influence of chill, operating upon cutaneous capillaries that have been exhausted by long sustained stimulation. It is a common remark that illness among cattle is apt to be produced by what are called sea-rains. Now these occasional sea-rains are invariably connected with cold gales blowing in from the ocean. These rains are not ordinarily heavy on the uplands, but they are chilling. It is not unworthy of remark that this cause of mischief is one which can be largely guarded against by care, intelligence, and good management. Protection from chill consequent upon sudden depression of temperature is an affair that comes quite within the domain of art; the chill can be avoided by warm clothing, well-regulated exercise, comfortable dwellings, artificial fires, and the various expedients that act upon live stock in the same direction. Sudden cold is more easily obviated than long continuing heat.

The large vicissitude of temperature tells differently at the opposite seasons of the year. In the summer season the *daily* range of temperature is comparatively small, and the vicissitude between day and day. In the winter season the *daily* range

is comparatively large, and the vicissitude lies between day and night. This is a natural result of the cloudiness of the summer day and of the sunniness of the winter day. The cloud keeps the day temperature from rising so much above the night temperature as it would otherwise do in the summer-time. The sun, on the other hand, in winter lifts the day temperature far above the night temperature. This is singularly and strikingly illustrated when the temperatures are laid down as zones upon paper. The winter zone is a broad even sweep, with very slight irregularity of outline. The summer zone is a narrow belt broken up everywhere into Alpine peaks and intervening abysses.

The mean temperature of Maritzburg, for a period of eight years, is 61.71°; the mean highest temperature of the year for this period, is 95.60°; and the mean lowest temperature of the year 33.10°. The highest temperature that occurred in this period was 97.60°, and the lowest temperature 29.00°. The mean temperature of the coast-district is about 3.5 degrees higher than the mean temperature of Maritzburg; but this district experiences less extremes of both heat and cold. Its climate is more equable; it is indeed semi-tropical, and approaches in a small degree towards the climate of the Mauritius. The impression made on going from the uplands to the coast is somewhat like that which is experienced on entering a warm and moist conservatory.

The rainfall at Maritzburg is very nearly the same as the rainfall of London. The mean fall for a period of eight years was 30.11 inches. The greatest yearly fall during this period, was 37.31 inches; this fall, however, is not so evenly spread over the entire year as in England. The fall takes place principally in the six hot months that lie between September and April. There are two mid-winter months (June and July) in which only seven-tenths of an inch of rain falls for the month, that fall being distributed into three days and a half. For the two months before, and the two months after June and July, the fall is 1.4 inches distributed into 8½ days. During the six summer months 4 inches per month fall, and the fall is distributed into 15½ days: thus 24 inches out of the entire 30 or four-fifths of the whole quantity, fall during the summer half of the year.

During the comparatively dry season of winter the dews are frequent and heavy on the uplands; hence the water-courses do not dry up. The rivers and streams run all the year; but the water is low in winter, so that horsemen can ride and waggoners be driven through every stream that is encountered. Even the large Tugela, nearly two-thirds of a mile wide, in Nova

fordable near its mouth. In the summer season, the water is deep in most of the rivers, so that they are impassable otherwise than by bridges, boats, or swimming. On the whole, on account of the broken distribution of the land and the general set of the currents, the land is wonderfully well watered. There is scarcely a spot in the colony, excepting on the very hill-tops, to which water may not be led by a little contrivance.

The rainfall on the coast-districts is about one-half as much again as at Maritzburg; this is chiefly due to the sea-rains being heavy on the coast, and comparatively light on the uplands. On the higher hill-tops these sea-rains become merely heavy mists. In the month of June, last year, I was caught by a sea-storm between two small rivers on the coast, and detained by the flood seven days, and then finally gave up the attempt to push onward over the swollen and dangerous streams, and made my way home to Maritzburg along one of the ruin ridges of watershed. The rainfall on the coast during these seven days amounted to $9\frac{1}{2}$ inches, 2 inches falling within twenty-four hours on two occasions. The fall at my observatory at Maritzburg, for the same period, about 40 miles from the coast and 2600 miles high, was a trifle over one inch and a quarter! Falls of this extreme character are fortunately comparatively rare; a much more serious, and, indeed, disastrous one occurred in the month of April of the year 1857. It is said that 27 inches of rain fell at Durban, and between 10 and 11 inches at Maritzburg, between the fourteenth and sixteenth days of the month. I was not in the colony at that time, and cannot vouch for the accuracy of this estimate; but, at any rate, there is no doubt that the Vaal River rose 28 feet above its normal level near its mouth, and burst open its across the sandflats, described in a previous page as the site on which Durban stands, to the Inner Bay. The water was at one time within 12 feet of the level of the principal street of the town. The Tongathi River rose 50 feet above its usual level. The Umvoti River rose 16 feet, and spread a bed of sand 4 feet deep over the rich grazing pastures. Even the Maritzburg-river, the Ummandusi, where the fall was so much less, carried away its bridge, and cut off the communication between the city and the port for several days. The sea-beach was covered by trunks of trees and beds of reeds, brought down by the rivers, 200 dead oxen were counted at one place on the beach, within a distance of 10 miles. The thunder-storms of the summer season are commonly heavier on the uplands than on the coast. This is well marked at the elevation of Maritzburg, and is still more notable at greater heights.

The days and amount of rainfall at Maritzburg for the several months of the year, expressed in an average deduced from observations of eight years, are—

	Rainfall, in inches and tenths.	Days on which it falls.
January	3.42	10
February	4.41	13
March	7.29	13
April	1.44	9
May	0.45	4
June	0.25	1
July	0.74	3
August	0.14	1
September	1.62	6
October	3.66	17
November	4.58	17
December	5.04	18

The actual rainfall at Maritzburg for eight years was—

	Inches and tenths.
1878	27.42
1879	28.40
1880	29.60
1881	22.41
1882	20.14
1883	31.06
1884	1.34
1885	21.18

Sum total for eight years . . . 244.8 inches, or
20 feet.

The mean humidity of the air at Maritzburg at nine in the morning, deduced from a period of eight years, was 71.2 (100 representing saturation). At three in the afternoon it was 66.1; and at nine in the evening 82.4. The mean humidity for the year was 70.8.

The mean height of the barometric column at Maritzburg, deduced from observations during a period of eight years, was 27.891 inches. A mean of a comparison of eighty sets of observations by standard barometers gives 29.5671 feet as the height of the observatory above the Custom House at Dublin, which is near the high-water level; the exact position of the observatory being 24° 30' 15" of N. lat. and 30° 1' 34" E. long. The highest reading during eight years was 28.474 inches, and the lowest reading 27.215; the extreme range for this period being therefore 1.259 inches. The mean yearly range for the period of eight years is 0.491 of an inch. There is a constant daily rise and fall, the greatest fall occurring two or three hours after noon, and the mean daily range of this rise and fall being 0.078 of an inch. This daily fluctuation is of course dependent

on the direct influence of the sun. The sun warms and lightens the air every day as it shines down on the earth's surface from a high elevation.

Within the limits which have been thus named the barometric column is in a state of incessant movement. This is immediately seen when the successive heights are laid down in curved lines upon paper. There are little daily billows in the line, the troughs between the billows corresponding with the early afternoon hours of the day. But there are also large waves, varying in number between four and seven in each month. There can be no doubt that this succession of large waves is due to a constant and recurrent reversal of the set of the atmosphere. When the general movement of the mass of the air is from south to north the barometric column is pressed up, and when the general movement is from north to south the barometric column falls. The direction of this main movement is not always indicated correctly by vases, because there are frequently local currents produced on the actual surface which conceal and mask the larger movement. Occasionally the southward movement of the air is developed along the surface in its full intensity. There then occurs what is known in Natal as the "hot wind." This wind begins to blow from the north-west in the early morning with extreme violence, and continues in great force until noon or the early afternoon, when it suddenly falls, and is followed by a fresh sea breeze. During its continuance the barometric column falls, and the temperature rises to somewhere between 86 and 97°. The air becomes so parching and dry that living plants shrivel, and articles of furniture shrink and crack. In extreme cases the moisture of the air sinks even below 33°. This wind is almost always followed by a thunder-storm. It is somewhat remarkable that this wind scarcely ever extends quite to the sea-coast. It rushes down some distance beyond the parallel of Maritzburg, and then encounters the sea-breeze in its full strength and in some way glides up above it. When the hot wind is blowing in full force at Maritzburg there is generally a much gentler breeze setting more or less along the coast at Durban, and a temperature some 7° or 8° cooler.

The hot wind blows at Maritzburg upon an average 25 times in the year. It is liable to occur in every month of the year; and when its recurrence is watched through a brief period, it does not seem possible to connect it with any certain condition or law. But when it is noted for a longer time it becomes clearly apparent that it is intimately connected with the seasonal position of the sun. This is strikingly illustrated when the mean frequency of its recurrence in the several months

of the year for a period of eight consecutive years is numerically expressed. For the last eight years this frequency stands in the following ratio.—

	Mean for eight years.
January	1.3
February	1.2
March	0.7
April	0.8
May	1.2
June	0.8
July	2.3
August	3.2
September	6.1
October	4.2
November	2.4
December	1.7

It will be seen, from this deduction, that September is the great month for the hot wind, and that it prevails more and more frequently in the two months that precede September, and with diminishing frequency in the two months that follow September; and that it is of comparative rarity in the other months of the year. It may be looked for about once in the months of January, February, March, April, May, and June; about twice in the months of July and December; about three times in August and November; four times in October; and five times in September.

The violent hot wind of Natal is clearly connected with the winter gale of the South Atlantic that so frequently works devastation in the neighbourhood of the Cape of Good Hope. On the 17th day of the month of May last year (1865) a furious north-west gale burst upon Table Bay, and destroyed a considerable number of ships. The mail steam-ship *Athens* was driven upon the rocks in making the attempt to steam out to sea from the bay, and lost, with every living soul on board. Now the approach of this gale was indicated at Maritzburg by the movements of the barometer six days before and during the height of the storm a fierce hot wind was blowing in Natal. On the morning of the 11th of the month the barometer was standing at 28 inches and a tenth; from this it fell during eight successive days until it was depressed to 27 inches and seven-tenths. It then rose suddenly and rapidly for three days until it reached nearly to 28 inches and four-tenths. There was thus a great atmospheric hollow or furrow 11 days broad, and at the instant of the greatest depression of this furrow there was a north-west gale blowing at Table Bay and a hot wind blowing at Maritzburg. The crisis of the gale took place about twenty hours later at Maritzburg than at Table Bay; that is to say, the focus of the disturbance required so long to

travel from the meridian of Table Bay to the meridian of Maritzburg, a distance of 800 miles in round numbers. The temperature rose at Maritzburg during the crisis of the gale to 85° , although it was near the period of mid-winter. The wind was from the south-east at the beginning of the barometric depression. On the 15th it veered from south-east to north-east, then passed to south-west, and back to north-east. On the 16th it was blowing strong from the north-west, then passed to south-west and south-east, and on the 18th again burst into fierce north-west with the lowest dip of the barometric depression; after this it veered through north-east and north to east as the mercurial column rose. The sudden and violent reversals of the air-current about the period of the height of the gale conferred somewhat the character of the cyclone upon it; but my own impression is that these turbulent hot winds are rather manifestations of one of the great forces that underlie the whirlwind than the whirlwind itself. I take it to be the sudden transference of what is normally the upper current of the atmosphere in mass to the lower regions near to the earth's surface, and I should look for the true whirlwind, not in the mass of the southward flowing air, but in the margins of the antagonistic streams where they come into direct conflict. The heat and dryness are in all probability the accidental results of this south-eastward flowing wind having been primarily fed from the hot and arid regions of Equinoctial Africa. In the South Atlantic the same current is fed from the broad spaces of the Equinoctial Ocean.

The winter rains occur with the high crests of the barometric waves. The thunder-storms and summer rains with the depressions of the waves, and the hot winds with the greatest depressions. Thus, rain falls in Natal with both high and low barometer. The thunder-storms burst just when the barometric column begins to rise after the lowest hollow of the depression.

The thunder-storms in Natal are of great intensity, but of brief duration. Clouds gather over the hill-tops, and then spread rapidly out into the valleys. The storm for the most part breaks first in the hills, and then moves rapidly off towards the east, giving three or four near discharges in rapid succession as it passes, and then making the rest of its display with increasing distance. The lightning is often of exceeding beauty, the track of the discharge not unfrequently being seen upon the background of the cloud as a broad quivering ribbon. Paraboloid and elliptical discharges amidst the clouds, with descending or radiating lines setting off from them, are not unusual. Occasionally very interesting streams of horizontal discharge are seen running through the cloud-caps of the Table

Mountains just parallel with and above their flat tops. The colour of the lightning is very various. It is sometimes of a bright rose tint; sometimes of the hue of pink topaz; sometimes amethyst; sometimes orange; sometimes pale blue; sometimes pearly white; and occasionally of a dead leaden tinge. When a storm occurs towards evening the horizon is illuminated for some hours after dark by incessant flashing. The end of the vast storm-cloud is brought out a deep relief at each discharge by glows of electric light bursting forth from behind its edge, the foldings and twistings of which are rendered conspicuous by lines and sheets of coloured fire. I have seen displays of this character taking place simultaneously on six different points of the horizon, and continuing for hours at a stretch, and I have counted fifty-six flashes in the minute. Accidents of course happen sometimes from the violence of these discharges. Kafirs and animals are occasionally killed. The death of European settlers is comparatively rare, for the double reason that they are much more sparsely scattered over the open country, and that their houses are generally protected by lightning-rods. The town of Maritzburg is now so abundantly protected with rods that accidents within its precincts are of very uncommon occurrence. I have only known two or three chimney-tops struck, and some half-dozen blue-gum trees shattered, during nine years. In the open country considerable numbers of oxen huddled together in the storm are sometimes killed at once. The popular notion is that the discharge runs through the beasts in succession. My own impression, derived from the appearance of the ground where such accidents have taken place, is that the discharge acts at one blow over the entire area covered by the earth, and divides itself among them. The heaviest rainfall that I have seen during a thunder-storm has been about an inch and a half. I once only measured an inch within the hour. The heaviest fall I have known to take place within 24 hours was 3 inches.

Very heavy hail-storms occasionally happen in connection with the thunder-storms. The hail, for the most part, sweeps on in the midst of a tornado, a distinct drum, or rattle, being heard to herald its approach for one minute, or even two minutes, before it arrives. Hailstones as large as pigeons' eggs are sometimes seen. Masses of ice weighing three-quarters of a pound have in rare instances been noticed. The fall of the hail is always limited to a comparatively narrow zone. The path of the hail-storm is accurately marked out over the country by a long narrow line of devastation.

III.—On the Lower Portion of the River Indus. By Colonel C. W. TREMENEERE, C.B., Royal Engineers, F.R.G.S.

Read, December 10, 1866.

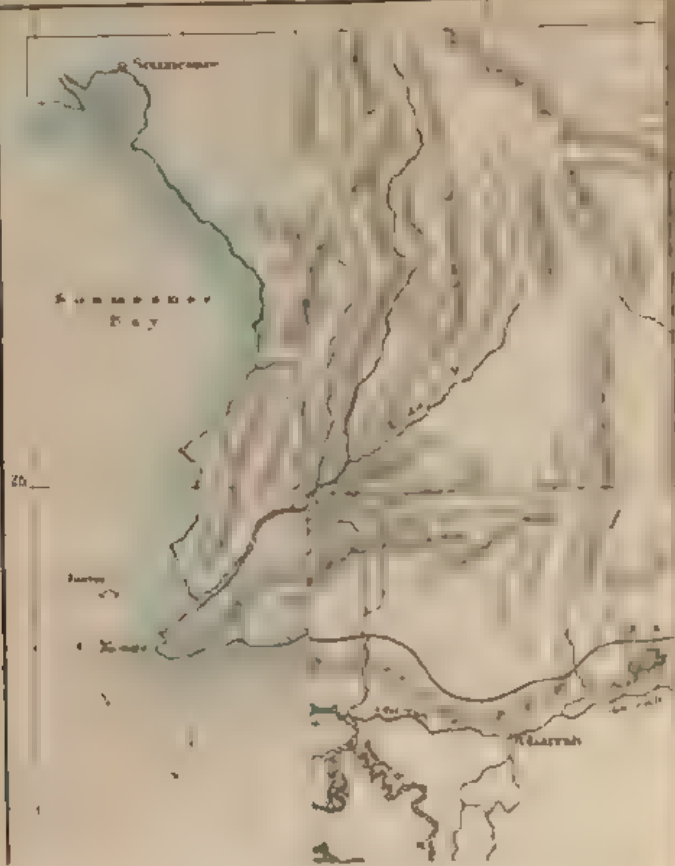
THE portion of the Indus to which the following remarks apply is comprised within the province of Sind, from its most northern boundary at Mittee, on the Panjauh frontier, to the sea. The direct distance between these points is 330 miles. But by the windings of the river, as measured on the large map of the Revenue Survey, the distance is about 540 miles.

From the extensive series of levels which have been carried out by Government for irrigational purposes, many of which having been reduced to the same datum, viz., the mean sea-level as fixed by the officers of the Great Trigonometrical Survey, Mittee is 227·22 feet above the datum line; and as this point is very slightly above the water-level during the inundation of the river, the surface slope of the river may be stated to be nearly 478 feet or 5·7 inches per mile. If the slope be calculated from Mittee to the benchmark nearest to the river mouth, the result gives 5·8 inches per mile, or nearly identical with the former. The slope calculated from the direct distance gives 78 feet or 9·3 inches per mile.

The general course of the river between Mittee and Sukkur is in a south-westerly direction; but immediately after passing the latter place it turns to the northward and westward, and from thence to near Oonurpoor describes a large curve having a radius of about 80 miles, with a versed sine of 60 miles. From Oonurpoor to the sea it does not diverge much from a direct course, although there are considerable breaks.

I have endeavoured to mark approximately the limits of the valley of the Indus by shading the high ground which bounds it. This limit is absolute along the whole of the western side of the valley, and is marked by the Lill district, extending from Cape Monze to the west of Kurmichee in a wide curve by Kotraee and Seewan to the entrance to the valley of Shaapoor. This Lill range, portions of which are upwards of 6000 feet high, extends without a break to the Bolan Pass, and is connected with the great Suliman Range. On the eastern side, on the contrary, the valley of the Indus may be said to have no very defined boundary; with the exception of the range of limestone hills, extending from Sukkur and Rosee to Kot Dadoe, which terminates to the south in low sand-hills (similar in every respect to the desert tract which extends along the whole of this side of the valley) there is no high land which defines the boundary of the Indus Valley to the eastward.





Between the boundaries thus indicated, the plain of the Indus will be seen to vary much in width. Its physical aspect is characterised by a very remarkable uniformity throughout, in the entire absence of channels for natural drainage, in its almost uniform slope both towards the sea and away from the river's banks, and in its mineral character. I have shown that the slope of the valley in a direct line to the sea is about 9 inches in the mile, and the lateral slopes on either side of the river are in many cases quite as much. The river throughout this portion of its course passes along a ridge, and is thirty feet above the land a few miles distant on either side of it. This vast plain is entirely composed of the finest siliceous deposit mixed with a variable proportion of argillaceous matter and mica; some portions resist the action of the river better than others, but generally the banks are easily cut into. Such is the fineness of the soil, that neither in the bed of the stream nor in any portion of the plains is it possible to find a grain of sand so large as a pin's head.

The Indus, like other tropical rivers, is subject to annual inundation, the extent of which has been carefully registered for many years both at Sukkur and at Kotree. At the former place it generally rises from 12 to 13 feet above a fixed datum, assumed as its low or sub-season level; but the inundations of the river at this latter period are considerable at this point, the water having in some seasons fallen to more than 2 feet below the datum. The inundation level is, however, more permanent at Kotree. On the contrary, the level of the water is more permanent during the low season, and the fluctuations are greater in the inundation. In ten years the water was only four times below zero, and it twice reached 18 feet on the gauge at the height of the inundation.

The rise between February or March and the middle of June may be attributed chiefly to the melting of snow in the Himalayas, while that from 15th June to September is the result of the monsoon rains discharged on the southern slopes of the same mountains.

The amount of rainfall in Sind is so small that cultivation may be said to be entirely dependent upon the rise of the river. The whole country is intersected by a network of canals by which water is, during the inundation season, led to great distances, and for which the lateral and seaward slopes of the land afford great facilities. These canals are generally opened in the month of May, when the land is prepared for the crops, and the supply ceases in September. An early fall in the river is, of course, most injurious to the crops, but generally the supply may be considered as quite as reliable as that

derived from rain in those portions of India in which agriculture is dependent upon that source of supply.

The maintenance of these canals in a state of efficiency is under the supervision of Government officers, and both the revenue of the State and the prosperity of the cultivators is, of course, dependent upon the due performance of the duty.

Government are at the expense of clearing all the main channels, and have abolished the system of forced labour which existed under the previous Native governments.*

The amount of silt contained in the water of the Indus is remarkably great. From a series of careful observations made at Sukkur and Kotrieh, it has been ascertained that, at the height of the inundation, the solid matter in the water amounted to about 436 parts in ten thousand by weight, and at the end of December to 17 parts. The discharge of the river at the former period is about 380,000 cubic feet per second, at the latter 680,000 cubic feet. Assuming a mean discharge of 200,000 cubic feet per second, and the amount of solid matter at 25 parts in ten thousand, we should have 5866 million cubic feet of material carried to sea in the year, or 217½ million cubic yards, sufficient to cover 70 square miles with deposit one yard in thickness. I am not aware that any observations have been recorded which show so great a proportion of silt in any other river. The details of the experiments, with a description of the method of collecting the water from different depths, and the subsequent operations, are given in an appendix.

The river flows in a very shallow bed, and the banks are generally ill-defined. During the low season navigation is difficult for boats drawing four feet, and the course of the stream becomes more tortuous as the inundation subsides. During the low season the channels wind about between the large sand-banks formed in the bed of the river, and are in process of continual change. The stream appears, by an automatic action and with almost life-like instinct, to adjust its surface slope with each change in the amount of water which passes down. At this season the falling in of the temporary banks is constantly taking place.

The banks of the inundation period, though much more stable than those above described, are by no means permanent, and some towns and villages have been swept away and rebuilt

* There are four modes of irrigation in Sind — 1st. By the Persian wheel, where the water is below the axle of the wheel. 2nd. By *naqra* flow, when the water in the canal is above the land. 3rd. By wells drawn by Persian wheels. 4th. By distributing water derived from rain from the natural drainage canals which issue from the hills ranges. Much land which has been flooded during the inundation is now brought under cultivation, and bears good crops without further irrigation, and there is also some cultivation in parts after rain.

on other sites two or three times within the last twenty years. These banks are frequently below the level of the river at the height of the inundation, and the crest of the inundation wave is then spilt over them, the water passing down the side slopes. Extensive tracts of country are then occasionally flooded, and a very large amount of water escapes from the river, especially in that part of the left bank below the junction of the Sutlej with the Indus, in the Bhawalpoor territory. Such floods, after passing into the low country bordering the desert, have often found their way into the Eastern Narna, and after filling innumerable dunds (natural depressions among the sand-hills), spread over the unutilized plains as far south as Nowarote, or even into the Ran of Cutch. In other seasons the flood has extended from the right bank about Knamore, and having covered the whole country between Shikarpoor and Jacobabad has reached beyond Kyree (Ghurree to the west.*

It will be seen from the distances to which these floods extend, that although it is merely the crest of the inundation wave which is spilt over the banks, the body of water thrown over the country must be very great. The floods frequently cause great damage, not only to existing cultivation, but to public buildings. As they take place only when the inundation is nearly at its height, the supply is cut off as soon as the crest of the wave has passed, and, as the water spread over the country is absorbed, the ground, unless injured by excessive and repeated floods, affords excellent spring crops, which reimburse the cultivator for the loss he may have sustained by the destruction of the usual inundation crop. A succession of such floods, however, is found not only to destroy the land, but to make the cultivator disinclined to undertake the labour of preparing his land for the safer and more legitimate husbandry of the autumn crop. It has not unfrequently happened that in the expectation of a flood which did not occur, land has been left unutilized, and the opportunity for putting in a crop has been entirely lost†

The extensive sand-banks formed in the bed of the river are frequently many feet above the level of the water during the low season, and become quickly covered by a thick growth of young tamarisk; those which are not swept away by the next inundation, being thus protected from the action of the current on their surface, are gradually raised by successive deposits

* When the crest of the inundation wave sets with force against one bank of the river, the height of the water pressing upon that bank is considerably greater than that upon the opposite bank, and this determines the direction taken by the flood.

† These extensive floods are confined to the upper portion of the proventus.

of silt to the level of the high banks, and frequently become comparatively permanent islands bearing forest trees. The main banks, where they have not been cleared for cultivation, are also covered with a luxuriant growth of tamarisk and elephant-grass, or forest trees.

The heavily charged water which passes through this vegetation is deprived of its silt, which tends to raise the level of the bank, and the velocity of the water which escapes from the river is checked.

I have stated that throughout the large area occupied by the Indus Valley, the nature of the surface soil may be said to be identical from Mittee to the sea, and that the river occupies a ridge having a tortuous course of 540 miles, in a direct distance of 330 miles between those points: and I would remark here, that had it taken, like an ordinary drainage channel, the lowest ground, its course would have been materially shortened, and it would have passed down the still existing channel, called the Rhain, into the Eastern Narra, and by Nowacote to the Run of Cutch. These old channels are still of very considerable size, and it is an interesting question whether they indicate the course of the river at any former period.

The country between the Narra and the present river contains many remains of old channels, some of which extend for many miles continuously, and have well defined banks, with a glacis on each side. They have in many cases a very tortuous course, but are straighter as they approach the sea. There are so many of these old channels to the eastward of the present course of the river, while such marks are rare and indistinct on the right bank, that one is led to the conclusion that the river has gradually worked to the westward. There is unfortunately no authentic map of the Eastern Delta, or of the country south of Meerpoor, which shows the course of the old channels now referred to, which terminate in the Run of Cutch. It is possible that formerly the chief outlets of the river may have been by these channels, and that the accumulation of an enormous deposit, derived from the river, in the Run, in conjunction with an upheaval of that district, which there are grounds to believe took place in the year 1819 (Burns' Travels), may have forced the river to form new channels having more direct communication with the ocean, and thus to assume its present course.*

* In Sir A. Burns' Travels into Bokhara, it is stated that previous to 1762 the Phogran, being a branch of the Indus, emptied itself into the sea by passing the western shores of Cutch. Its annual inundations watered the soil, and afforded the means of irrigation. It is stated that the supply was, however, cut off by an artificial embankment, but that in 1802 the Indus water was entirely excluded by

The completion of the survey of the Eastern Delta and the extension of the series of levels into the Run of Cutch will probably throw some light upon these subjects.*

It would, I think, be an assumption, for which there is no sufficient evidence, to state that the whole of this Indus plain has been regained from the sea by deposit from the river. The height of Mittee, 257 feet above mean sea-level, and the still greater height of places such as Moodtan and others further north, where the same general features are found, renders this more than improbable. But further it is to be observed that at Sukkur the river is crossed by a barrier of rock, the depth of water over which in the low season is only 5 or 6 feet. Between Kotree and Hyderabad, also, there can be little doubt that the rock on either side is connected at no great depth. At Jerruck rock appears on both sides of the river, and again on the line south from Latta to Peerputta. There are thus indications that the actual depth of deposit at and near these points, at least, must be very slight: and it can hardly be supposed either that the sea ever extended far up the valley, or that the river can have gradually worked itself up its own plain from a much

the erection of another band at Ali Hauder. In June, 1849, an earthquake occurred which raised a mound which passed entirely across the course of the Phoonan, separating it from connection with its former outlet into the sea, but this, as well as the artificial embankments, are said to have been forced by the large flood of 1821, which came down from Bhawalpoor and along the Eastern Narra, and ultimately reached the Run of Cutch. The Phoonan is a well defined and large channel across which several bunds have been constructed in the lower part of its course to retain water which carries it from the canals which take it from the main river as well as the Korahee, but such bunds could not have been constructed until after the Phoonan had ceased to derive a supply by direct communication with the Indus. This direct communication had therefore probably ceased at the first period above referred to, or at all events before 1802—Burns, vol. 1 pp. 305-315.

* Sir A. Burns describes the Run as extending about 200 miles in length, and about 36 in breadth, or occupying an area of about 7000 square miles. The whole tract may truly be said to be a "*terra inculta barrenis*," fresh water is never to be had anywhere but on islands, and there it is scarce; it has no portulage, and vegetable life is only discernible in the shape of stunted *triatra*-herbs. It differs as widely from what is termed the sandy desert as it does from the cultivated plain. It has been designated a marsh by geographers, which has given rise to many erroneous impressions regarding it. It has none of the characteristic of one, it is not covered or saturated with water but at certain periods. It has neither woods nor grass in its bed, which, instead of being spongy is hard dry, and sandy, of such a consistency as never to become clayey unless from a long continuance of water on a particular spot, nor is it otherwise stony or swampy. It is a vast expanse of flat, hardened and cemented with salt sometimes an inch deep (the water having been evaporated by the sun). The natives of Cutch, Mohammedans as well as Hindus, believe that the Run was formerly a sea; they point out at this day different positions said to have been harbours. The Run has communication with the sea both on the east and west by means of the Gulf of Cutch and a branch of the Indus, and it is flooded from both these open seas as soon as the south-westerly wind sets in about April each year, the greater portion of the Run is thus annually flooded.

lower level, and surmounted such a rock barrier as that at Sukkur, as must have been the case had its original course been much either to the east or the west of that point.

I believe that hitherto no adequate explanation has been given of the oscillation of rivers in their courses. Why, for instance, does the Indus in passing down an incline which may be considered perfectly regular between the two extreme points herein referred to, 330 miles apart, assume a course 510 miles long? I am aware that Mr. James Fergusson, in his '*Notes on Recent Changes in the Delta of the Ganges*,' has suggested a theory the result of which, if I correctly understand his meaning, would be that the flatter the country through which a river passes, the sharper would be the curves. I believe this to be contrary to fact, and that the only explanation which can be given of the subject is that a river discharging itself down any continuous slope, in a soil capable of being acted upon by it, must assume such a course and section as may enable it to adjust its surface slope to every variation in its section or body of discharge at each season of the year. It is obvious that the channel of such a river as the Indus, passing through a country consisting of material so easily acted upon as that upon its banks, could have no permanence if its course were materially shorter and its surface slope greater than that it has assumed.

I would also point to the fact that, during the inundation when carrying a large body of water, the course of the Indus is more direct than in its low state, when the water not only follows the course of the larger reaches of the river, but winds from side to side, or round the extensive sand-banks within its wide channels, thus adapting its surface slope to suit the small and ever-varying amount of discharge at that season. Should my views on this subject be correct, it would result that the larger the body of water and the less the surface slope of the country, the more direct will be the course of a river; and, on the contrary, the sharpness of the bends of a large river passing down a plain would indicate the existence of a considerable slope in the country. I should, in this manner, infer that the valley of the 'Tigris' between Bagdad and the marshes north of Hoorah, has a more considerable slope than that of the Indus. The general statement I venture to make is, that with a fixed or virtually fixed maximum discharge and an ascertained difference of level between any two points on a large river passing through an alluvial plain, the length of its course is also absolutely fixed. The longer, therefore, a river becomes by extending its delta to seaward, the greater tendency will there be to assume a more direct course.

I have stated that the boundary of the valley of the Indus on

the eastern side is the Thurr or Desert, and it is desirable that I should describe it.

In mineral character portions of this district differ very little from the great plain of the Indus: other portions consist of pure siliceous white sand, but the district has everywhere been raised into ridges and low hills, which are very remarkable as having a north-east strike over a very large area. The valleys or depressions between the hills have frequently no outlet or communication with each other, and are at a very low level. Where wells have been dug in these basins, water is found only at great depths. The height of these hills increases towards the south, and there are more distinct indications of the existence of a soft and very friable sandstone formation below the surface. The remarkable similarity of the surface of a large extent of this desert with that of the Indus plain would indicate that the formations are identical, the desert portion having been subject to upheaval by a force acting in north-east and south-west lines; hitherto no levels have been extended into this district.

Whatever may have been the position of the Delta of the Indus in former times, and there are grounds for supposing that it has been considerably more to the eastward, it must now be deemed to commence at some distance to the south of Tatta. It will be seen that only two branches leave the river from the right bank, the Baggaur and Hujamree. The first, now a small channel, not more than 80 yards in width during the inundation, discharges its water after a very winding course into what must be considered as a large lagoon extending from the vicinity of Kurachies to the main embouchure of the river; the second, the Hujamree, carries off a large body of water, about one-third of that in the main stream. It passes by a winding course to the sea, and its mouth affords the best navigable entrance for trading-vessels; it is indeed the only entrance now used; and the town of Khelat, situated on it, was the chief port of Sind for the trade with Bombay, and generally for all trade carried on by native coasting-vessels, until the construction of the railway, joined with the high prices, the result of the American war, enabled the merchant to divert the traffic in cotton, wool, and such other articles as would bear the extra charge of transport, to Kurrachee.

There are also only two delta channels which leave the Indus from its west bank—the Mootnee and the Mull, both of these diverge from the river below the point at which the Hujamree takes off. The left bank delta has not yet been properly surveyed, and very little is known of this district even by the revenue officers.

The western delta has very recently been surveyed by Captain Macdonald. The coast will be seen, by the map, to extend in nearly a straight line from the mouth of the Hujra river to the entrance of the Kurrachee harbour, and is formed by a line of sand-bank topped by low dunes.

The coast is extremely flat, and the extent of shore left dry at low tide very considerable.* Behind the screen formed by the coast-line, there is a very large area of marsh-land permeated in every direction by tortuous creeks and channels, the tidal water to supply which is derived from a number of wide but shallow passages or openings in the coast-line. These openings have been most improperly called mouths of the Indus; but it is obvious that they are in fact merely passages for the tidal water to and from the lagoon. From their connexion with each other, by means of the large creeks within, a safe navigable canal is afforded during the monsoon season to the steamers which ply on the Indus between Gholzee, close to Kurrachee, and the river, when such vessels are quite unfit to make the direct passage from Kurrachee to the river-mouth. Within the lagoon the channels are well defined, though very tortuous, and deepen gradually as the distance from the Indus increases. The soundings in those to the northward are as much as 3, 1, and $1\frac{1}{2}$ fathoms at low water, at many miles from the sea. The mud-banks within this lagoon have now been raised nearly to the level of ordinary high water mark, by deposit of salt mud on which mangrove and soda-plants are the only vegetation. This mud is blue-black in colour and very fine, but, when dried, it becomes of the same light-drab colour as the Indus mud.

The bay and harbour of Kurrachee is situated at the extreme northern end of this delta. The bay is formed by Munora point, a natural hill, consisting of clay beds capped by conglomerate, at the southern extremity of a reef about 10 miles in length, by which it is united to the mainland, and on which the action of the surf, which breaks directly upon it, has formed a beach capped by a narrow ridge of blown sand. The opening of the bay between Munora and Clifton is about 3 $\frac{1}{2}$ miles wide, but this opening is backed by rocky islands in the centre, and by the island of Keamaree at some distance in the rear. The entrance to the harbour, and the only navigable channel, is close to Munora, the anchorage extending from within the shelter of that point to the western end of Keamaree. With the exception of this comparatively deep portion, and two branch channels of no great extent, the whole space within presents at low water

* The map shows the line of high water only.

an area of extensive mud-flats, some of which are covered by mangrove-bushes. The tidal area is generally at a level of 6 or 8 feet above low water, or from 1 to 3 feet below high water at spring tides. The surface consists of a layer from 3 to 6 feet thick of stiff, black mud, formed of silt mixed with decayed vegetable matter, lying on a bed of sand of variable quality, in some places fine and very thick—a quicksand, in fact—in others coarser, containing sea-shells or approaching gravel. The whole overlies a bed of stiff blue clay, which appears to be the natural surface. The superficial deposits extend to from 9 to 25 feet below low-water mark.

On a careful examination of these superficial deposits, it has been found that the stiff black mud, mixed with vegetable matter, is identical with that found on the mud-banks within the lagoon, which has been already described. Its mineral character, as well as that of the fine sands below it, and the whole of the surface of Keamaree, is marked by the presence of a very fine white quartz, mixed with a large proportion of mica, and is thus identical in composition with the silt carried to sea in the waters of the Indus.

The presence of mica within Kurrachee Harbour must be regarded as affording a strong presumption that the deposit within its area is derived from the Indus. I have examined the sands in the minor drainage channels, which discharge into the sea between the mouth of that river and Sornancee, and from several places on the Mekran coast, and found them all characterised by the entire absence of this mineral. It does not exist on the Mekran coast, where the set of the current is to the eastward, and I can see no escape from the conclusion that it is swept up the coast from the mouths of the Indus.

The agency by which this is effected will be easily understood by referring to the map of the coast-line.

The south-west monsoon breaks upon this coast early in May, and lasts without cessation until September, during the whole of which period a heavy surf beats upon the shore. It is precisely during this period that the Indus is discharging its flood-waters so heavily charged with sand and silt. The direction in which the surf breaks upon the coast is marked upon the map by a series of parallel broken lines, which form a considerable angle with the general coast-line. The result of this oblique action of the sea-stroke, even upon coasts which are not subject to winds which prevail continuously for any long period, is not only to force any matters held in suspension in the water in the direction of the stroke, but, as shown by Sir H. De la Beche in the extracts appended, to produce a shore current.

"Though, for convenience, the Mediterranean has been treated as a tideless sea, and without motion, this is not strictly correct, inasmuch as small tides are felt in it, and currents are found. Indeed as respects the latter, when powerful winds by their friction force the surface waters in one or even direction for the time, well seen when it runs against any part of the bottom or coast,* the movement is then sufficient to carry any suspended matter, mechanically suspended, in distances proportionate to the power and continuance of the winds."—P. 82.

For many miles to seaward the depths of the Indus coast are within 8 fathoms, and the 1-fathom line extends from Munora Head in almost a straight line nearly parallel to the coast.

"The observer has now to consider the distribution of fine matter in mechanical suspension by means of ocean currents. Some of these are known to be very constant in their course, others periodical and many temporary. We have seen that the pressure of strong and continued winds forces up water by their friction on its surface in tideless seas, and consequently would expect that in the open ocean similar winds would force water before them, though the absence of land would produce a modification in the result. When the area exposed upon was limited by a single range of coast, the modification would be less; and with two lines of coast presented to a sea between which the water could be forced and lateral fall prevented, there would be at a given distance to the effect observable at the north and south extremities of the Caspian, or on the east and west shores of the Black Sea, where the waters are pressed forward by the powerful winds."—Pp. 100, 107.

"With respect to temporary currents, they are found to be instrumental to several kinds of wind of long duration, and by force the surface water before them. Along channels and along coasts these are chiefly felt, the two boundary shores or the single coast opposing the further rise of water and throwing them off in the manner of tidal waves."—P. 116.

"When detrital matter is thrown into the tides it is borne on and fro by them according to their flow and ebb, and the barrier will have abundant opportunity of seeing in the coasts of the British Islands and of the ocean shores of Europe, that the river waters when swelled by rain are copiously with the ebb, and in the direction it takes along shore much mechanically suspended detritus, which does not again enter the rivers unless under very favourable circumstances. As a whole, much fine detritus thus conveyed is carried coastward by the ebb, and accretions are formed of it there, by which it is contained repeatedly in the next ebb, so that should a stream, broad and rapid and a bay be formed between it and the embouchure of the river, there is a tendency to deposit the finer sediment in the locality so entered." P. 100.

The manner in which beach material is swept along a coast in the direction of the sea-stroke is well illustrated in figs.

* An observer may often have opportunities in the ports of the Mediterranean of seeing the rise or depression as the case may be of the sea, according as the winds at the time may be blowing with strength off or on shore. Canals frequently afford good opportunities of observing this kind of action of wind on water, the canal level in still weather being accurately known, it becomes easy to see how raised these waters are raised or depressed as the winds may press them in one direction or another. Mr. Smeaton found that in a canal four miles in length, the water was kept up four inches higher at one end than at the other by the action of the wind along the canal. The Caspian Sea is several feet higher at either end, according as a strong northerly or southerly wind may prevail.

53 and 51, pp. 66 and 67, of the same book. It is obvious that in fig. 54 (Fig. 1, below), not only has the beach, *b b*, traveled from *g*, and been spread along the whole intermediate space between *g* and *c*, but whenever the winds blow for any length of time in the direction marked by the arrows, there must be a continuous movement of materials in the same direction; and should there be a bay beyond *c*, in which the material can find shelter and repose there, accumulation must take place.

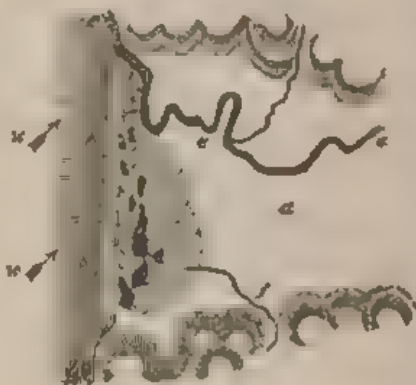


Fig. 1.

The manner in which the deposit in the lagoon, and within Kurrachee harbour has been formed, is extremely well described in the last of the above extracts from Sir Henry De la Borne, and it would appear that the whole shore-line between the mouths of the Indus and Mucra has been formed by the action of the sea-stroke forcing the sand and silt discharged by the river in the direction of Kurrachee Harbour.*

In July, 1865, a steamer was sent down the river to the mouth of the Kyamree, and anchored within the bar, but as far out as she could lie with safety. 860 pint bottles corked, wired, and weighed to float as low as possible, were thrown overboard at intervals between 8 A.M. and 5.10 P.M. on the 27th July; 61 of these were found on the beach of Clifton, close to Kurrachee, by 1.31 P.M. on the 29th, but these were ascertained to have been 47 hours in transit, and the direct distance being 49 miles, it may, perhaps, be assumed that the assistance of a current in this direction, amounting to 1 mile an hour, was thus proved.

By the 4th August 214 bottles had been picked up, either on Clifton Beach or within Ghazree Creek. With so strong an underdraft into the numerous openings to the Lagoon as must

* Large quantities of driftwood, consisting of branches of trees known to grow on the banks of the Indus, are cast on shore at Clifton and Kenmare, and carried into the harbour during each monsoon. The coast is so shallow, and the surf beating upon it is so heavy during the monsoon that no vessel can approach it from seaward, and it is therefore difficult to test the existence of a coast current by actual experiment.

exist along the whole of this line of coast, a great many of the bottles were doubtless prevented from reaching so far to the north, and the above number, which were found may be deemed as large a proportion as could be expected; but in addition to the indraft, the bottles floating at the surface were exposed on approaching the coast to the force of the surge, and would necessarily partake in the motion of the breaking crests, and be driven leeward, they are not, therefore, a fair indication of the course taken by the sand and silt held in suspension, and diffused through the whole body of the water.

In this manner the circumstance that none of the bottles were found either within Kurrachee Harbour or on Keamaree may be explained.

From the action of the coast current, whose existence may now perhaps be assumed as proved, there must be a considerable backing-up of water during the monsoon within Kurrachee Harbour. I have called attention already to the position of the Island of Keamaree, and have stated that it is composed entirely of fine sand; the portion above high-water mark consists entirely of blown sand derived from its own shore. At many feet below low-water mark its composition appears to be the same, and the whole must, I believe, be regarded as a deposit from the sea, due to the backing-up water in the harbour deflecting the coast current, and throwing it off towards Munora Head in the manner I have endeavoured to exemplify by the arrows in the appended sketch. Should this view be adopted as correct, the existence of the island in its present form and position may be considered as a further illustration of the existence of the coast current.

I have stated that both in the Lagoon and in Kurrachee Harbour too superficial black mud is mixed with a large quantity of decayed vegetable matter. A large quantity of a very dark brown vegetable fibre, in a fine state, is deposited each monsoon in any sheltered spots, such as on either side of a stone groin which has been carried out from Keamaree towards Munora; this, when first deposited, is so soft that a man walking on it sinks to his knees. On examining specimens of this material, and of the more solid matter from within the harbour, Dr. Robert Haines, chemical analyser at Bombay, wrote.—“What I think may be taken as quite certain is that the vegetable matter is not the remains of any phanerogamous plant, the structure is entirely cellular, even the bundles of apparent fibres in the larger masses are mere aggregations of elongated cells.”

The first specimen sent had been washed and dried; sutec-

quently a mass of wet mud, 3 inches cube, was sent in a tin box. Dr. Haime's report on it was thus given:—

"It confirms for the most part my first opinion, except that the fragment which in the dried state of the first specimen I took for minute fronds of *Enteromorpha*, are now seen to be the loosely aggregated fibres which make up the expanded stem of a larger sea-weed. The bundles of fibrous matter, where they have not met, distinct, are held together by a brown membranous tube, a sort of skin, composed of very right elongated cells held up later each other at the ends. The fibres are flat and very thin, composed of cellular tissue. This is exactly the structure of a sea-weed stem, the stem-layers being lignified, intermediary coils having pitted and dissolved away and left the vessels separate. I found one small fragment of an exogenous branch embedded in the mass. I have now a doubt of the mass being a marine-stem deposit. The fragmentary state of the vegetable matter forbids the supposition of its having grown *in situ*; it appears to have been deposited with the mud in its present broken state."

From the above description it is evident that the large deposit of black mud, mixed with sea-weed and mica, has been swept into Kurruckee Harbour and into the Lagoon by the tides, and by the current which sweeps up the coast at the very time when, owing to the heavy surf breaking upon the coast, a vast quantity of sea-weed must be broken up and swept away.

The lift of the tides on this coast varies from 8 to 11 feet at springs, their course is in a direction parallel to the coast-line, the flood-tide coming from the north-west and the ebb running in the opposite direction. During the monsoon months there is a strong set in the offing to the south-east, or in a direction contrary to that along the shore of the Lagoon, which is entirely local. Both currents are produced by the same cause, the action of the long-continued sea-stroke on a coast-line forming a considerable angle with the crests of the monsoon waves. (See Map, on which the probable course of the two currents is indicated by arrows.) By the action of the current in the offing it is probable that much silt, which has been swept to the northward as far as Kurruckee Harbour, may be again carried to the southward, and be perhaps eventually deposited in the eastern delta channels or carried into the Run of Cutch.*

The action which I have endeavoured to trace must have a considerable influence in checking the growth of the delta to seaward, the surface of each successive monsoon exerting its immense power in the removal of any deposit which would otherwise tend to extend the banks by which the main channels

* See note, p. 73. It seems highly probable that the enormous deposit in the Run may have been derived from the Indus.

discharge into the ocean. The progress to seaward is thus dependent upon the advance of the whole coast-line between the mouth of the river and Ghuznee, a process which must be extremely slow.

In Mr. Fergusson's *Memoir on the Delta of the Ganges*, a remarkable depression in the bed of the sea, called "the Swatch," is noticed, and its existence is attributed to the meeting of tidal waves proceeding from opposite directions. A depression very similar in character exists off the mouth of the Indus, and called by the same name on the Charts. In this case it cannot be caused by any action of the tides; it is merely a natural gorge or narrow valley extending between two banks, and communicating directly at its southern extremity with the deep ocean. The two banks are themselves on different levels—that to the eastward having 14 to 16 fathoms, while the western bank has 45 to 50 fathoms. The soundings within "the Swatch" are irregular, varying from 100 fathoms to 160 and 200 fathoms, with no bottom. The line upon the Chart, intended to show the limit of 100 fathoms, may be considered as marking the crest of a submergal plain, beyond which there is a rapid increase in depth. This crest appears to maintain a course nearly parallel to the general coast-line along the whole of the Mesran coast.

APPENDIX.

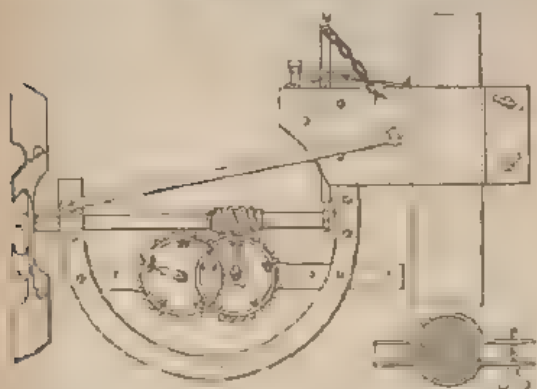
Description of the Mode adopted in taking Observations to determine the velocity of the Indus, and the amount of solid matter in its Water, at different depths.

Fig. 1 represents the instrument used for taking the velocities, which was a modification of Whilman's Machine. It was fitted to a round pole, or piece

FIG. 1.

INSTRUMENT FOR MEASURING THE VELOCITY OF THE CURRENT IN THE RIVER INDUS AND CANALS IN HIND.

Reduced to one fourth the size.



of iron gas-pipe about 15 feet long, having an iron cross-head fixed to the top to show the axis of the instrument, which could thus be made to correspond with the direction of the surface-current. The construction of the instrument has been previously accepted by trials, the regularity of revolutions made by the vane in a given time, being when crossed through mud and water, at various velocities, was found to be equal.

The observations were taken from a boat, either fastened to the bank or anchored in the stream. The instrument was drawn to the rod at the required depth. As soon as the pole was in an upright position, with the cross-head in the proper position, the trigger was pulled. The vane was usually allowed to revolve for 30 seconds, when the trigger was dropped, and the result registered by the index mechanism. The observations were in every case repeated, until a single observation was taken on; and, whenever there was any material difference between two experiments, the observations were continued.

In very strong currents, and at any considerable depth below the surface, the instrument gave readings which varied considerably from each other; this was owing to the difficulty of holding the rod in the direct line of the current,

and to determine it, but even in such case it was not sufficient to obtain reliable results, as may be illustrated by the following observations:

No. of Observations	Revolutions	No. of Observations	Revolutions
1	187½	5	194
2	226	6	204
3	235	7	233
4	235		

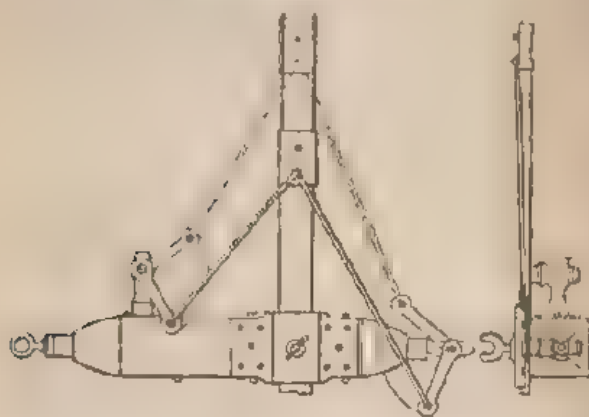
It may, perhaps, be taken for granted that the 2d, 3d, 4th, and 7th are nearly correct, and that the instrument was not held quite in the direction of the current in the other experiments. The mean of the above four gives 229 revolutions, equivalent to 11½ feet per second, or very nearly ½ mile an hour.

In every case the observations for velocity were taken first, and then the samples of water were drawn from the current, and so on. The apparatus employed to effect this is shown in Fig. 2. The net or net in which the bottle

FIG. 2.

BOTTLE FOR TAKING WATER FROM BELOW THE SURFACE, TO ASCERTAIN THE QUANTITY OF SILL.

Reduced to one-eighth the size.



could be fixed at any required height below the foot was 14 or 15 feet in length. The valves or cocks were worked by strings fastened to the brass slides, and passed over pulleys at both ends of the reel. The water so drawn was at once put into bottles, attached in order to a box made for the purpose, and the whole then care only required. The filters previous to use, were introduced in the usual manner, and with the deposit were thoroughly stirred, a small bottle and weighed in separate vessels. The quantity of water was exactly measured in the usual graduated glass measures, and the specific gravities were obtained by means of a specific gravity bottle.

An examination of the numerous measurements at different depths will show that some confidence may be felt in the correctness of the observations with the

instrument employed. With respect to the variation in the proportion of silt at different depths, the facts prove that the material in suspension is not distributed in any exact proportion to the depths and velocities. Taken as a whole, however, the results show but few of these anomalies. In the Sukkur observations, the proportion of silt increases with the depth with considerable regularity, though here also a few exceptions occur.

The mean result of the observations at Kotree, in November, is that the quantity of silt amounts to 1-672nd part of the water by weight; but as no observations could be taken where the river was deepest and most rapid, this fraction is too small to represent the proportion in the whole discharge of the river. The observations taken at Sukkur, in December, give the proportion 1-516; but this again, owing to the access of flood-water during the experiments, gives too large a value, and I am disposed to adopt as an approximation 1-550 or 1-600, say 16·6 parts in ten thousand as the proportion of silt by weight in the whole discharge of the river during the low season, or somewhat less than half that contained in it during the height of the inundation, viz., 43·6 parts in ten thousand.

It may be observed that the actual quantity of sand and silt moving forward with the current at any one time must be the same in each section of the river. The rule which is applicable to the uniform discharge of water in different river sections must apply equally to the solid material held in suspension. Where the velocity is exceptional, as in the narrow pass at Sukkur, the water and sand are more intimately mixed, and the surface-water will contain a larger proportion of sedimentary matter than elsewhere; but the total quantity of solid matter is no more affected by the additional velocity than is the volume of water discharged by the river.

RECORD of OMSKAVARTONS to ascertain the amount of Silt contained in the Water of the Indus during both the Inundation and the Low Seasons, made in the months of July, August, November, and December, 1864.

Date.	Site.	Gauge.	Depth of Water.	Depth from Surface.	Velocity per Second.	Quantity of Water.	Deposit on Filter.	Proportion of Silt to Water.	Specific Gravity of Silt.
1864.						lbs. ozs. dwts.	Grains.		
July 23 ..	Sakur ..	10 11	10 0	6 10	9.5	2 2 5 1 1 1½ 0 14 0	62 86 26	1/244 1/208 1/235	
						4 1 6½	124	1/232	
.. 25 ..	Ditto ..	11 4	8 6	6 10	3.5	2 0 0 1 13 0 1 15 0	50 51 47	1/290 1/248 1/288	
						5 12 0	148	1/272	
.. 27 ..	Ditto ..	11 8½	8 9	3 9	4.58	2 4 2 2 2 6 1 13 4	72 75 63	1/220 1/202 1/204	
						6 4 4	210	1/209	
.. 28 ..	Ditto ..	11 11	9 2	6 3	4.2	2 2 3½ 1 12 14 2 2 2	64 51 85	1/235 1/241 1/182	
						1 12 2	70	1/176	
						7 14 2½	270	1/204	

RECORD OF OBSERVATIONS to ascertain the amount of SILT contained in the Water of the INDUS, &c.—continued.

Date.	Site.	Gauge.	Depth of Water.	Depth from Surface.	Velocity per Second.	Quantity of Water.	Deposit on Filter.	Proportion of Silt to Water.	Specific Gravity of Silt.	
1864.										
August 3 ..	Sukkur ..	12 3½	11 0	8 6	About 4.0	lbs. sec. dwts.	Grains.	1/305	2665	
" 9 ..	Ditto ..	13 0	11 0	10 0	..	13 3 0 13 12 4½ 36 15 4½	449 465 904	1/312 1/308		
July 29 ..	Centre of river	11 11	50 to 90 ft.	11 9	Not observed	2 4 0	75	1/310		(Mean for foundation period.
			Total at Sukkur ..		.. ..	84 11 3½	2613	1/327	..	
December 24	Sukkur ..	0 7	7 6	5 6 3 6 1 6	1.75 1.95 2.66 2.06	2 14 3½ 2 13 1½ 2 16 0 8 10 5	36 20 20 78	1/634 1/986 1/1038 1/777		
" 26	Ditto ..	1 1	7 3	5 3 3 3 1 3 Surface	4.27 4.57 3.03 3.03	2 11 4½ 2 3 0 2 15 2½ 2 3 2½ 10 1 12	23 20 93 16 61	1/331 1/765 1/909 1/965 1/870		

27	Ditto	..	..	1	8	3	8	7	8	4.86	2	2	5	35	1/398
								6	5	5.5	2	3	2	36	1/426
								3	8	6.26	2	6	0	33	1/503
								1	8	6.47	2	3	0	36	1/487
											8	14	7	142	1/440
28	Ditto	..	..	2	0	9	0	7	0	5.16	2	5	6	90	1/183
								5	0	5.5	2	5	6½	60	1/375
								3	0	6.72	2	6	0	45	1/369
								1	0	6.93	2	6	0	44	1/378
											9	7	4½	239	1/377
29	Ditto	..	..	1	11	7	4	5	4	5.54	2	3	4½	36	1/432
								3	4	6.21	2	5	7	36	1/460
								1	4	6.80	3	3	3	..	..
								0	4	6.80	3	3	3	39	1/576
											7	12	6½	111	1/492
30	Ditto	..	..	1	7	8	5	6	5	4.07	2	6	0	35	1/475
								4	5	4.74	2	6	0	33	1/503
								2	5	4.87	2	5	6	30½	1/541
								0	5	5.12	2	3	3	31	1/787
											9	5	1	119½	1/546

RECORD OF OBSERVATIONS TO ASCERTAIN THE AMOUNT OF SILT CONTAINED IN THE WATER OF THE INDUS, &c.—continued.

Date.	Site.	Gauge.	Depth of Water	Depth from Surface	Velocity per Second.	Quantity of Water.	Deposit on Filter.	Proportion of Silt to Water	Specific Gravity of Silt.
1864.									
December 31	Sakkur	1	7	5 3 3 3 1 3 0 3	4.03 4.62 5.16 5.29	2 0 0 1 6 3 1 8 0 2 2 0	26 28 17 20	1/537 1/332 1/637 1/743	
						7 0 0	91	1/539	
1865.									
January 2..	Ditto	0 10	2 5 2 11	0 6 0 11 Surface	2.56 4.04 .19	2 2 5 3 0 0 2 3 5	20 29 21	1/760 1/724 1/742	
						7 6 3	70	1/739	
			Total at Sakkur			68 10 5	93½	1/515	
1864.									
November 23	Kodree	3 2	13 0	11 0 9 0 7 0 5 0 4 0 3 0 1 0	1.63 2.16 2.37 2.52 .. 2.68 2.73	3 1 5 3 0 4 3 0 1½ 3 1 6	27 29 26 32	1/804 1/734 1/810 1/895	
						12 4 0½	114	1/769	

{}=00148 mean for Low Season.

(=00149 mean for
Low Season.

24	Ditto	..	..	3	0 1/2	14	0	12	0	1-85	3	0	3	25	1/846
								8	0	2-52	3	0	3	46	1/162
								4	0	3-06	3	1	7 1/2	34	1/642
								Surface		3-48	3	2	3	28	1/787
											12	5	2 1/2	133	1/554
25	Ditto	..	..	3	0	14	0	12	0	..	2	13	2	37	1/535
								8	0	..	3	1	0	30	1/714
								4	0	..	3	2	1 1/2	35	1/578
								Surface		4-7	2	1	6	20	1/738
											1	3	1 1/2	120	1/553
26	Ditto	..	..	2	11	16	0	14	0	1-38	3	0	0	24	1/875
								10	0	1-55	3	1	5	27	1/804
								6	0	2-22	3	1	4 1/2	28	1/774
								2	0	2-22	2	15	0	25	1/822
								Surface		2-55	..	..	..	..	..
											2	2	1 1/2	104	1/817
28	Ditto	..	..	2	10 1/2	15	0	13	0	Variable	2	15	0	48	1/457
								9	0	..	3	0	4 1/2	30	1/530
								5	0	..	3	1	4 1/2	44	1/492
								2	0	..	2	15	4	24	1/866
											12	0	4 1/2	159	1/550
											59	15	2 1/2	524	1/572
															..

1/100149 mean for
Low Season.

IV.—*Notes of a Journey from Bida in Nupe, to Kano in Hausa, performed in 1862.* By Dr. W. B. BAIKIE, R.N. Extracted from portions of Dr. Baikie's Journals in the possession of the Foreign Office, by J. KIRK, Esq., M.D.

Read, January 14, 1867.

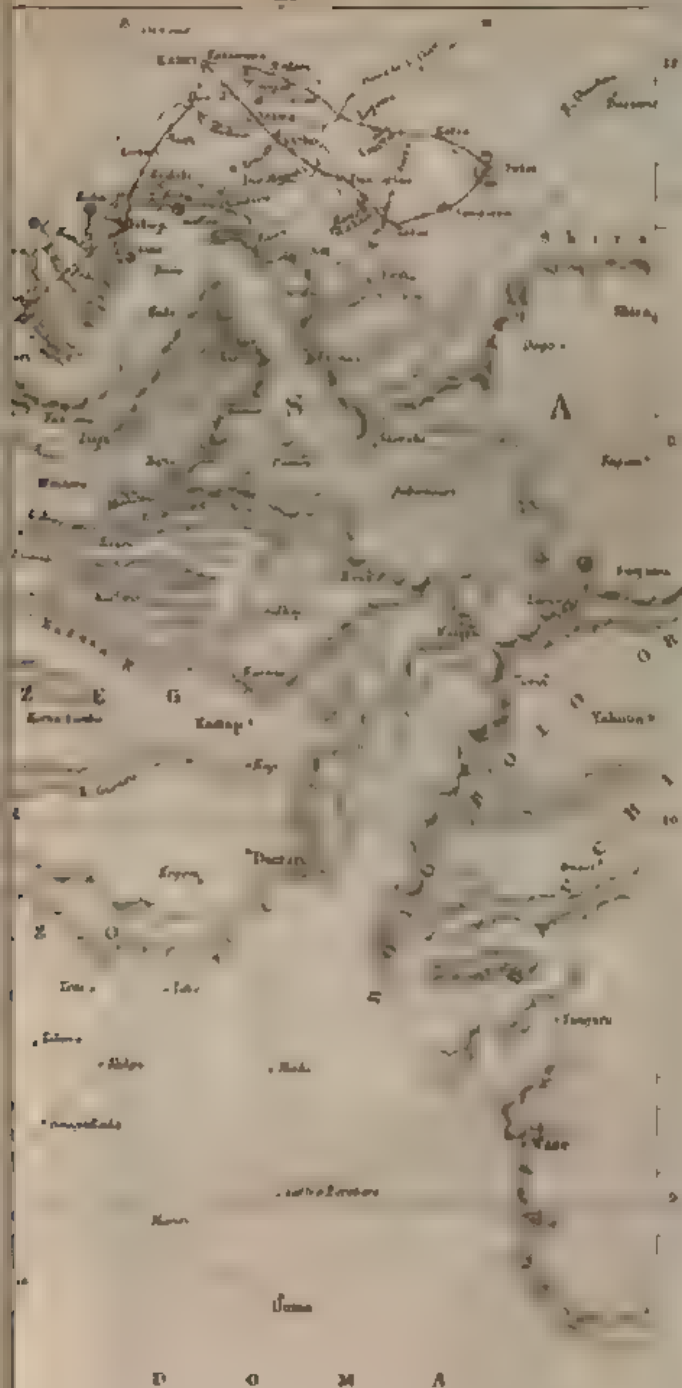
IN December 1861, Dr. Baikie left the settlement he had formed at the confluence of the Niger and Benue, and went to Bida, the capital of Nupe, a town of great size, to the north of the Kwarra, from which it is distant about 16 miles.

It was not before the month of April that arrangements for the journey were completed, pack-oxen bought, and the jealousy of native traders overcome. On the 12th of April, 1862, Dr. Baikie set out in company with Ibrahim, a native of Zariya, then returning with presents from King Maesaba to his Chief. The first was a short march of 9 miles to Kpakpigi, over level wooded country. Next day, many towns of considerable size were passed, and the boundary of the kingdom of Nupe crossed. They slept at Lemu, inhabited by Gburi, a northern race, who on the arrival of the travellers were celebrating a pagan festival.

On the 14th they came to Tsiyi, which overlooks the valley of the River Kaduna. The country passed consisted of low undulating plains, with sandstone ridges, covered with grass, bush, and forest. The meadow in front was clothed with grass and a few large trees scattered here and there, in which the people had placed bee-hives made of basket-work. Heavy rains, which fell in the night, inundated the plain and detained the party the following day.

On the 16th, crossing the alluvial valley, they reached Gbogi. On the banks of the Kaduna, outside the town wall, a steep descent of 50 feet leads to the water, which had already risen a foot from the early rains. The middle channel, which was 6 feet deep, was crossed in canoes, which occupied until 3 in the afternoon; then, crossing the plain diagonally in a north-easterly direction, they left the valley and ascended a gentle slope with dense bush and forest. They spent the night at a town of the Bassa people, from which an extensive view was obtained over the flat monotonous landscape. These Bassa are part of a wild turbulent race, living in isolated communities. They are for the most part heathen, but practise circumcision. At the foot of a sandstone ridge, on which the town was built, there lay a pool of water, to which after dark Dr. Baikie went to wash, but found on his return that it was full of crocodiles, fed and worshipped by the pagan inhabitants of the place.

17th April After crossing several sandstone ridges clothed





with bush and trees, among which were the fleshy euphorbia, they made a steady ascent to Gari Gobuz. The rock formation here is still the stratified sandstone found in Nupe, with a very steep dip to north and north-east. On one of the ridges before coming to Gumma, there are several prominent peaks of semi vitrified rocks, which consist chiefly of quartz. Gumma is built between two rocky hills, which rise from a well-cultivated plain. It is the chief town of this portion of Bassa, and contains 3000 mixed population, chiefly Bassa and Gbani, all of whom speak Hausa.

On leaving Gumma, it was necessary to have the loads carried outside the gates before being placed on the animals. Having crossed a low ridge of granite, they entered a rocky defile, with perpendicular faces 200 feet high, on which were native villages, whose inhabitants are an industrious race, cultivating the rich lands below.

Pegyna, which they next came to contains 3000 people, chiefly Kamuko, with a few Bassa and Gbani. Although inferior in rank to Gumma, it is a town of greater importance. In the market, milk and butter were cheap and plenty, also vegetables; but guinea-worm is very prevalent among the people, from the water being drawn from stagnant pools in the town.

21st April. Under an escort of one horseman and one foot soldier, they set out, and, after riding 8 miles, came to a detached rock, named Ungwoi Karami, which rises 500 feet above the plain. Here is a barrier of thorns, at which toll is demanded of all caravans at the rate of 5 cowries each man, which in a large party comes to a considerable amount; and a like impost is taken at two other barriers in front. Being the King's guest, this toll was not demanded, but a present given instead. After passing the second of these barriers, the rocks retire on the west, leaving an open valley, and a huge rock standing in front, at a small village, on whose slope the party remained. While huts were being prepared they sat under the shade of a large baobab-tree, behind was a perpendicular face of rock; near it a group of women were engaged rubbing down grain into meal under the shade of a cupressia which grow from the crevices of the granite rock. The green valley in front, dotted with trees, pools of water, and herds of cattle, seemed like an English park.

The chief's daughter, a lady of mature age, brought water to drink; she was dressed with only a few leaves hung in front from a cord round the waist. The men had a leather apron behind. Yet this independent, rude people are kind and intelligent.

On the 22nd April they left Ungwoi and entered Kamuko, reaching Wasaba in the afternoon. This is a walled town,

built at the foot of a conical hill of granite, whose north and eastern slopes are precipitous. From half-way up Dr. Baikie obtained a general view over the country, but was prevented from ascending, as the summit is held sacred by the natives. Inside the town walls there are *borassus*, *hyphaene*, and date-palms. By the riversides in the surrounding country the raffia and wild date palms are abundant.

23rd April. The path was through dense jungle with open glades, in which herds of cattle were grazing. The shea butter-tree here attains an unusual size, and ripens its fruit in June. The people were now busy collecting the fruit of the locust-tree. On the 24th April a change was noticed in the vegetation, which now differed from that of Nupe.

On passing Gidan Magaja they left Kamuko, and entered again among the Ghami, sleeping in the town of Koriya, beautifully situated in a valley. Many smelting-furnaces had been seen, and iron-ore is here abundant in the metamorphic rocks.

On the 26th April they crossed level ground of a stiff clay, with ravines 50 feet deep, cut by the floods; the sides of these consisted of beds of clay and gravel. In the bottom of stream-beds the rocks were commonly of metamorphic sand, but the plains where the clay has been washed away showed granite, either flat or protruded above the general level. As yet the rains had scarcely influenced the rivers, and where now only a few inches of water were found, in the month of September there would be two or three fathoms, and canoes required to cross with.

At Ruku, or Riyuka, where they slept on the 27th, the papaw-tree was seen in cultivation. 28th April they had entered the country of Zariya, and crossed a dense forest full of wild animals, on the banks of the Karsi. The date palm (*Borassus flabelliformis*) forms a marked feature of the landscape, with its tall cylindrical swollen stems.

On the 30th April they were before Zariya, one of the great centres of commerce in Hausa, frequented by merchants from Bornu, Adamawa, and Nupe. The silk-cotton trees which surround the town distinguish it in the plain; of these there are upwards of 1000, varying from 50 to 70 feet high. When close to the city a small stream is crossed, and the ground rises to the walls, which are 10 miles in circumference, and from 16 to 18 feet high pierced by eight gates, the ninth having been closed after the entrance by it of Mallam Musa.

At a former time the space included by the wall was much greater than at present, and included the Kufon hills, to the north-west, 700 feet high, and from which the only general view of the city is to be had. Zariya is built on a plain of tertiary

clay, lying on granite, which is here and there protruded. The height of this plain above the sea is 2000 feet, and rivers drain to the Kaduna, and so to the Kworra. Inland the land there are scattered groups of conical thatched huts, with gardens and fields between, wherein are plantains, papaws, date-palms, and vegetables with pasture for cattle. The king was now absent, engaged in war with those to the south. While messengers went to inform him of Dr. Baikie's arrival, an opportunity was offered of examining the towns, and gaining information regarding its history and commerce. The slave-market has of late years diminished, and not more than 300 daily were usually to be found in it at the time of Dr. Baikie's visit, whereas three years previously as many as 4000 might have been seen; the price is one-third less than at Bida, on the Niger. Here Dr. Baikie purchased a young woman for 90,000 cowries, to save her from being sent to the open market. On one occasion, when there were only 50 slaves in market, Dr. Baikie estimated the attendance from 3000 to 4000. Besides slaves, there are horses, cattle, dates, pomegranates, figs and wild fruits, with wheat, millet, cocon, cassada, onions, milk, and butter to be obtained. Turkey cocks are sold from 700 to 1000 cowries, and a young horse was purchased for 30,000 cowries. Theft in market is punished by a loss of hands and feet, and the fifth is a capital crime. There is no market-tax, but all animals are charged on leaving the city; a tax of 450 cowries is levied on each ind-gospit. An old man, with whom Dr. Baikie conversed, had known Dr. Vogel, and remembered his visit to Zariya, which was in the time of Abdu Salami; he was much liked, but spoke little Arabic or Hausa; he remained over a month. Another had been companion to Dr. Barth from Timbuktu to Kuka, and had seen Vogel in Bornu; and an old man recollected Clapperton's visit in the time of Abdul Kerim. The mosque of Zariya is a large building, 120 feet long, with two domes and a square tower at the north-east, ascended by steps. On the 20th May word came from the king asking Dr. Baikie to visit his war camp, which was to the south, near the Kaduna. The invitation was accompanied by a present of a slave boy. On the 23rd May Dr. Baikie set out again, accompanied by Ibrahim. Outside the wall they passed herds of cattle, and many fields of corn, coco, and ground-nuts. At sunset they passed a beautiful village, in a clump of locust-trees, but rode on and slept at a few huts, which they reached by starlight; here they found had accommodation, and went to bed after supping on meal and cold water.

On 27th May they came to Egabbi, 164 miles from Zariya, by the road, having crossed on the way several streams flowing south-east. Here Ibrahim set off on some private business.

leaving Dr. Baikie to exercise patience until his return, which was not before the 2nd June; then still following a southerly course, and crossing a stream 100 yards wide, with banks 15 feet deep, which in the rainy season would be filled, although now it had but 18 inches water, they came to Rabba, distant from the Kaduna three-quarters of a mile. The stream is here half a mile wide and 5 feet deep. Here the aneroid barometer was injured by a fall. Being now in country devastated by war and near the army, it became impossible to obtain food, and for several days Dr. Baikie had not enjoyed one full meal.

Turning westward they recrossed the Kaduna at one of its windings, where it was only 4 feet deep, and again on the 11th of June, where it was 200 yards wide and 5 feet deep, flowing among schist rocks.

At the war camp Dr. Baikie was well received by the king, but found it difficult to procure even the commonest food, which the king did not think it his duty to send to a visitor; at the same time he deferred payment of a debt of 400,000 cowries due for ten donkeys, until arrival in Zaria, but a slave girl was sent to reckon as 100,000, and a present of a slave to Dr. Baikie and his servant, in consideration of the presents given. The huts here were mere temporary shelters, ill calculated to resist the force of the tropical rains which now fell, so that the ground inside became a muddy puddle, on which branches were placed to keep the goods dry.

On the 15th June, the king moved his camp to the Kaduna— all was confusion; about 3000 horses, men, women, and beasts of burden pushing forward, worked the wet ground into a quagmire. The king went first with a guard of 50 horsemen and foot soldiers in front and in the rear, and selected a spot near the river, where rough huts were formed of branches, but it was evening before the first meal of the day was cooked. Here magnetic variation was found to be between 14° and 16° west.

18th June. Taking leave of the camp, Dr. Baikie followed a north-easterly course, and reached Zaria on the following day, passing the town of Zango, and a rocky dingle with blocks of granite placed one on another, like a Cyclopean wall, surmounted by huge boulders. Dr. Baikie's servant, who had been left behind at the beginning to bring up the heavy goods, had arrived, and some time was occupied in re-arranging the loads. On the 26th June, they all left Zaria on the road to Kano, sleeping at Lukero, a walled town with 1000 inhabitants.

27th June, they crossed several streams which flowed to south-east and joined the Kaduna, and reached Guyari. The country between Zaria and Guyari is nearly level, with wet meadows and bare granite rock.

On the 29th, having left the town of Antsan they found the

streams flowing in an opposite direction, to pass round Bebeji and join one of the affluents of Lake Chad; they were now, therefore, in the central basin of the Sudan. Fever, which during the first part of the journey had spared Dr. Baikie, now came on, from the severe exposure and bad food. No mention is made in any of the notes of the daily use of quinine, and as in his general instructions for the preservation of health it is equally ignored, we may conclude that subsequent experience had not convinced him of its value as a prophylactic. It has also failed in other parts. Faki is the border town of Zaria, having been given up by one of the rulers of Kano.

30th June. The banks of streams in this region are of reddish clay, with sand and mud, resting on crystalline rocks. Bebeji is a large town with double walls, outside of which are fields of corn, cassada, ground-nuts, and indigo. It had been visited by Dr. Vogel, who fixed its latitude with accuracy, but was prevented from going on to Kano, where cholera was then raging. But from a rock outside the town Dr. Baikie obtained good compass bearings, which include the rock standing within the walls of that place. In Bebeji there are dates, limes, and lemons.

1st July. A mile from town they crossed the River Kunza, and reached Kaffi.

2nd July. The River Mallam was passed, with now only 2 feet of water in its sandy bed. A mile from town they were met by messengers, who escorted them into Kato, where they were well received by Sarn Sarn, brother of the king, who was absent at a war camp in the south-eastern provinces of his dominion, whither it was at once agreed that Dr. Baikie should proceed.

On 5th July Dr. Baikie left Kano in light marching order. Outside the gate they passed Nasserawa, one of the suburbs and followed a south and easterly course, over level land with whitish clay. Several walled towns were passed and streams crossed, which had already been seen when coming to Kano. At Sokwa Dr. Baikie found a man, whose father had been slave to the King of Fezzan, who had known Richardson, Barth, and Overweg, and told him of the fate of the papers of Dr. Vogel after the murder of Corporal Maguire.

6th July. The River Mallam was passed on rafts of calabashes, named "gaddo," which take three persons each time; the path then lay near the town of Garka between two granite hills.

7th July. After crossing the River Kunza and a granite rock named Hangu, 150 feet high they reached Takai; but Dr. Baikie had a severe ague which forced him to dismount and rest for a time.

8th July. The king sent an escort to bring Dr. Baikie to Sangama, where he received him with much attention. In the

town there is a mass of quadrilateral blocks of granite piled on each other, like those seen to the south of Zaria; this peculiar form is due to the wearing of the granite in certain directions, which produces polished blocks, not unlike those similarly placed by ice-work in other countries.

9th July. Dr. Baikie followed the king and army to Dutsi, a town placed in an amphitheatre of hills. Here the king had a grand review of his army, and afterwards told Dr. Baikie that at Kano all papers should be given over to him; but it now appeared that the greater part still remained at Zinder, whither they had been taken by the Azhenawa after the murder of Corporal Maguire.

14th July. Dr. Baikie left Dutsi, following a more easterly route than that he had come by, and supplying materials to fill in the map of a region unvisited by Dr. Barth.

If Dr. Baikie kept notes during his residence in Kano, they are not to be found among his papers. Most likely, when dwelling in a house, he wrote them out at once in full, and sent them off with other diaries. From the rough copies and despatches written in Kano and forwarded to Tripoli, we learn that the papers he was in search of proved to be of no value: they consisted of two books on astronomy, in German, bearing the names of Vogel and Overweg; two Arabic psalm-books had also been brought to Kano, but were not forthcoming. After the murder of Corporal Maguire, it seems that the plunder, including manuscripts, a musket, and five-barrelled pistol, was taken to Zinder by the Azhenawa, where they still remain, and may be had for the trouble of going to get them; but as for the long distance already travelled, Dr. Baikie's supplies were exhausted, and he found himself compelled to return without having accomplished what he chiefly wished. While in Kano he suffered from fever, increased by his previous exposure and the filthy state of the city, which contains several lagoons of stagnant water, receptacles of filth exhaling malaria.

On the 11th August Dr. Baikie took leave of the king, and commenced his return to Nupe, following at first the same route he had come by, and afterwards a route more to the west. It was now the height of the rainy season, and streams which he had crossed without difficulty had become torrents filling their banks, and to be crossed only on rafts or in *taloes*. In the fields were heavy crops of corn, more luxuriant than those of the valley of the Niger; and the grass plains were more or less inundated. Around Bobey there were green fields of young wheat and rice. There, a mixture of cotton-seed and bran is given to oxen, and is considered the most fattening food; horses and asses are fed on millet.

In Zaria, where Dr. Baikie arrived on the 20th August, it was necessary to dry all the loads, which constant rain had thoroughly wetted. The king was still absent in Zamba.

On the 1st September they again set out, but were delayed at each of the small streams, and at Riyuka the huts were flooded and almost uninhabitable.

On 10th September, turning to the west of the old path and following a mountain stream, they came to Biran Guari, formerly visited by Clapperton. It is one of the oldest cities of this region, and is well placed in a valley surrounded by hills, with the Kuria River passing to join that from Womba, which meets the Kaduna near Akiri. The king of this place has a very bad name, in consequence of many travellers having disappeared mysteriously while under his protection. At Zhan Ruwa, which they reached on the 16th September, an epidemic had killed many cattle. With loss of appetite the animals sickened, and died in three days.

On the 24th September they again entered Gumna, but the king was waging war with those in front, and after a long delay Dr. Baikie was obliged to return to Feryina and follow a western route across the Marga River, which comes from Womba and Biran Guari; reaching Rabla on the 6th November, having found his old friend King Masaba in camp, and enjoyed his hospitality for several days. The Rabla daily fevers prevented Dr. Baikie from attending to business, and it was not before the 22nd December he was able to set out in canoes for his station at the confluence of the Niger and Benue.

II.

ESTIMATED COURSE and DISTANCE of JOURNEY between the NIGER and KANO
in HAUSA, 1862 with BAROMETRIC ELEVATIONS of the PRINCIPAL PLACES,
including the WATER-LANTING between the NIGER and LAKE CHAD.

Barometric Observations.

Hour	Alt.	Barometer Anno-14.	Place.	Hour	Alt.	Barometer Anno-14.	Place.
	"	In.			"	In.	
		29.55 min	Bida, 16 miles N. of the Kwana, 12 K. of the Kaduna.	3 P.M.	24	28.55	Wamiba.
		29.40 max		7.30 A.M.	51	28.2	Gidan Magaja.
				5 A.M.	80	27.7	Karu.
6 A.M.	82	29.30	Iema.	2 P.M.	29	27.60	Korima.
4 P.M.	95	29.25		4 P.M.	24	27.4	Karkasa.
1 P.M.	85	29.45	8 Ju.	5 P.M.	29	27.42	Karu.
Noon.	100	29.55	Bed of River Ka-	4 P.M.	30	27.55	Rufin-yani.
9 A.M.	83	29.15	duna.	4 P.M.	33	27.33	Zaria.
3 P.M.	90	29.2	Gumna.	9 A.M.	31	27.44	

ROUTE FROM BIDA TO KANO.

Distance.	Course (Comp. as bearings).	Place.
Miles.		
0	N N E.	Bida, 6 miles in circumference.
2½	N N E.	Kpal, agi, pop. 1,800.
1½	N N E.	Mankada, pop. 300.
2½	N N E.	Kpada, pop. 300.
5½	N N E.	Mwalata, pop. 1200.
3	{ N. F. N. by E. }	Lama, pop. 500.
2	N N E.	Dasagi, pop. 60.
4	N E by N.	Kasha, pop. 60.
6	N N E.	Tegga, pop. 1800.
1½	"	Gibor, pop. 800.
4	N. N. E.	Bed of Kaduna, sandy, no rocks.
6½	N. E. by N.	Wutere.
	N E.	Katumku or Gornu.
		Garn-gubuz.
		Three ridges, rising N. N. E., a kind of shale showing crystalline probably of the sandstone of Niger. <i>Sp. conchoid.</i>
4½	N E.	Gumma, pop. 2000.
6½	N. and N. E.	Tegyaia, pop. 3500.
2½	"	Lila-woi-bawa.
2	"	Wamba, pop. 2500.
12	{ N. E. and N. E. ½ E. }	{ Kwangoma, pop. 3000.
4½	N E.	Zhan-tu-wa, 1200.
1	N E.	Gidau-magaja.
11½	N E.	Karu.
10	N E.	K. raga.
11	N E.	Fayaka.
14½	E ½ S.	River Karai.
1½	E.	Katsa.
1.½	E.	Itol-nyash.
8	E.	Zariya.
2	{ N. 90° E. N. E. ½ E. }	{ Likoro.
14	N. E. ½ E.	Guyimi.
6	N. E.	Antao.
6½	N E.	Faka.
12½	N. E. ½ E.	Babej.
1	N E.	River Kusa.
6	N E.	Madobi.
3	N E.	Goza.
4½	N E.	Kash.
2	N E.	River Morlam.
6½	N E.	Kano.

ROUTE FROM KANO TO THE SOUTH-EAST AND NORTH.

Distance	Course (Compass bearings)	Place.
Miles.		
8	N. 26° E.	Kano.
3	N. 27° E.	Duwaki, 2 ditches, 4 gates, 1600 or 2000 inhabitants.
24	N. 34° E.	Mulaka, 2000 inhabitants.
44	S. 40° E.	River Malama, 1 mile wide, 5 feet deep in July.
24	S. 32° E.	River Arineta, 30 yards wide, flows N to River Malama.
2	S. 40° E.	Garko, walled, 2 ditches 3000 or 4000 inhabitants.
2	S. 40° E.	Dan Mulaka, 150 or 200 inhabitants.
24	..	River Dunda or Kanza, 60 or 70 yards wide, flows N by S., comes from Kanza and Roberi.
14	..	Small river flowing N to River Kanza, 15 yards wide.
3	..	Small river from Dal, N to Kanza, 60 yards wide.
..	..	Dan, Berina, a walled town, 2 ditches, 1000 inhabitants.
6	..	Village and rock of Iduga.
24	S.E.	River Dunder, Galya, small but deep stream.
44	S.E.	Takau, walled, double ditch, 500 inhabitants.
6	E.	Sangaya, walled, double ditch, 1500 inhabitants.
12	N.E. by E.	Duri, wall and stockade, several miles circumference, 2500 inhabitants.
24	N.W.	Kata, a ditch, stockade.
7	W.N.W.	River Dunder, Galya, 54 feet deep, 20 yards wide, flows N.
3	..	Galya, walled town, 2 ditches, 4000 inhabitants.
44	W.N.W. 1/2 W.	Lajawa.
6	..	River Malama, 1 mile wide, 7 feet deep, N 10° E.
..	W.N.W. 1/2 W.	Gogaya, stockade, 1500 inhabitants.
5	..	Village and rock of Imungar.
14	..	Kano.

RETURN JOURNEY FROM KANO TO RABBA.

(In returning, Dr. Baikie altered his course to pass by Birni Guari and to reach Katsina instead of Bida, whence he started.)

Distance.	Course (Compass bearings)	Place.	Distance.	Course (Compass bearings)	Place.
Miles.			Miles.		
2	?	Ryeka.	14	W?	Sumbi.
14	N. 25° W.	St. Paul.	..	N.N.W.	Abba.
6	N. 60° W.	Fa.	2	W. by N.	Obeta.
4	?	Birni Guari.	24	S.W.	S. rem.
12	S.S.W.	Kanari.	2	..	Stream.
10	S.S.W.	Kwaga.	24	S.S.W.	Inganla.
6	S.S.W.	Stream.	1	W.	Stream water
3	S.W. by N.	Stream.	82	..	Stream.
34	?	Gadan Magaja.	..	S.S.W.	Wassau.
1	S. 4° W.	Zhar-rwa.	24	W. by S.	Kibozhi.
5	S.W.	Kwaguma.	94	W. by S.	Lidgo.
10	S.W.	Wasabi.	84	W. by N.	Camp of Masaba.
12	S.W.	Ugwai Jawa.	64	S. 10° W.	Lameta.
2	S.W. by E.	Ugwai Karama.	64	S.W.	Kpaweta.
2	S. 10° W.	Kanama.	14	..	Paaga.
7	S. 70° W.	Teguma.	14	S. by E.	Ibi or Egbe.
24	W. by N.	River Mariga.	13	S.	Zigama.
44	N. 1/2 W.	(from Womata)	114	S.	Mekwa.
		Lali.	6	S.	Ratna.

Sum of the distances from Katsina to Rabba is 114 miles. Dr. Baikie's route was 114 miles.

III.

ENUMERATION OF KINGS OF THE FOLLOWING STATES OF HAUSA AND NUPE.

(From the Notes of Dr. W. B. Baikie, M.N., collected in 1862.)

1. Kano.	4. Katsina.	7. Ader.
2. Zariya.	5. Gobir.	8. Daura.
3. Zamfara.	6. Azben.	9. Nupe.

1.—The Kings of Kano in Hausa.

(From Notes collected at Zariya, May 25, 1862.)

	Yrs. mhs. dya.		Yrs. mhs. dya.
1. Bakuda	70 0 0	23. Abubakr Kadda ..	7 0 0
2. Kams	30 0 0	24. Mohamma Sabasara	1 0 0
3. Alkaji	2 0 0	25. Mohamma Zaki ..	37 0 0
4. Gaogau	50 0 0	26. Mohamma Abdallahi	4 5 0
5. Makarkari	2 7 0	27. Mohamma Katamdi	20 0 0
6. Kaowana	1 0 0	28. Alhaji	1 0 0
7. Senaida	30 0 0	29. Sekaro	0 7 0
8. Ramagaka	7 0 0	30. Kataka	8 0 0
9. Taratori	7 0 0	31. Suyaka	0 1 0
10. Bangazhi	50 0 0	32. Yawa	10 0 0
11. Jenaji	0 0 12	33. Dadi	33 0 0
12. Yazhi	10 0 0	34. Saraku	19 0 0
13. Umar	0 0 10	35. Mohamma Komfara	13 0 0
14. Nuto	0 0 10	36. Taukari	9 9 0
15. Goto	50 0 0	37. Yazhi	12 0 0
16. Danda	70 0 0	38. Baba Zaki	78 0 0
17. Abdalahi	15 0 0	39. Dauda	4 0 0
18. Yakubu	10 0 0	40. Alwali	27 0 0
19. Nushama Riufa ..	37 0 0	41. Sulimana	12 0 0
20. Abdalahi	11 0 0	42. Dabu	27 0 0
21. Mohamma	50 0 0	43. Usman	10 0 0
22. Yakahi	0 5 0	44. Abdu	7 0 0

The last four are Fulani Kings, of whom the last is now on the throne. Sulmana was a Folo from Bornu; Dabu a Basibeto of Kano; Usman son of Dabu, and Abdu, brother of Usman.

2.—Kings of Zariya in Hausa.

(From Notes collected at Zariya, May 26, 1862.)

1. Gunguma.	15. Kirari.
2. Matazo.	16. Zhizhinka.
3. Tumza.	17. Sukana.
4. Tumusa.	(The above seventeen were heathens.)
5. Suhmano.	
6. Nassau.	18. Rabbawawa
7. Damazaki.	19. Gudaunaska
8. Neigwago.	20. Nawakarri
9. Kusa.	21. Kimas
10. Nawinako.	22. Bakaturunku
11. Maskar.	23. Ibrahim
12. Kiyau.	24. Karma
13. Bariyakar.	25. Kafau
14. Nazhidadi.	26. Bako

	Yrs. mths. days
27. Aliyu	6 0 0
28. Sayi	11 0 0
29. Musa	0 6 0
30. Gabi	3 6 0
31. Waddi	0 1 1
32. Adokada	2 0 1
33. Buntama	3 0 0
34. Aliyu	27 0 0
35. Muhammadu Pablawi	0 6 0
36. Bessama Yasku	13 0 0
37. Baki	3 0 0
38. Sulemana	1 0 0
39. Abo	7 0 0
40. Hamidu	3 6 0
41. Muhammadu	17 1 0
42. Sulemana	3 8 0
43. Baki in Musa	6 5 0
44. Isah	2 0 0
45. Muhammadu Kaya	1 4 0
46. Baki in Musa	10 0 0
47. Muhammadu Gumi	11 2 0

	Yrs. mths. days
48. Babbon Kawa	7 0 0
49. Muhammadu Kawa	1 1 0
50. Isah	5 5 0
51. Baki in Musa	50 6 0
52. Aliyu	1 0 0
53. Muhammadu Matgan	8 0 0
54. Isah	20 3 0
55. Muhammadu	2 1 0

FULANI KINGS.

56. Mallam Musa	12 10 0
57. Yan Musa	14 10 0
58. Adu Kawa	11 5 0
59. Hamidu	0 3 53
60. Muhammadu Sali	77 3 4
61. Sali	0 10 0
62. Adu Sali	1 7 0
63. Adu, 6 years, now reigning in 1882.	

Fula Kings of Zariya.

- | | |
|-----------------------------------|------------------------------------|
| 1. Mallam Musa, Melle. | 5. Muhammad Sali, son of Yan Musa. |
| 2. Yan Musa, Pa-Fula in Bornu. | 6. Sali, son of Mallam Musa. |
| 3. Abdu Kawa, Pa-Fula in Katsina. | 7. Adu Sali, Pa-Fula in Zariya. |
| 4. Hamidu, son of Yan Musa. | 8. Adu, son of Muhammad. |

Mallam Musa, who subdued Zariya, came first as a poor Mallam, and Yan Musa was a petty trader wearing a "banti." When Mallam Musa became king, he made Yan Musa his head "Maidawaki." Sali was deposed for cruelty by Sultan Aliyu, and died or was killed in Sokoto. Muhammad Sali was very popular. Adu Sali was killed in battle; his father's name was Mallam Marka, born in Egabbi. Adu is a very quiet, reserved man, about 41 years old, and is on the whole well liked. He does not speak much Fula; he has numerous offspring, and his eldest son is his "Maidawaki."

3. Kings of Zamfara.

- | | | |
|--------------|--------------|----------------|
| 1. Mallam | 7. Dura Gadi | 11. Tabari. |
| 2. Yanku. | 8. Dura Gadi | 12. Muhammadu. |
| 3. Mallam | 9. Adam. | 13. Muhammad. |
| 4. Adu | | 14. Sali. |
| 5. Dura Gadi | | |
| 6. Na Gadi | | |

Fula Kings.

10. Muhammadu Zemu.

4. Kings of Katsina.

- | | | |
|------------------|--------------------|----------|
| 1. Alunta Bakka. | 4. Adu | 7. Gadi. |
| 2. Adu. | 5. Adu | 8. Kadi. |
| 3. Sali. | 6. Muhammadu Gadi. | 9. Kadi. |

10. Mekeratoma.
11. Asan.
12. Harudu.
13. Kambela.
14. Yakula.
15. Maham.
16. Norkin Magazhi.
17. Koran.

18. Teogwara.
19. Agogga.
20. Gogo.
21. Magazhi Kinaldu.
22. Dan Kasiwa.
23. Bano.
24. Umari.
25. Binom.

26. Awafsi.
27. Dan Gaura.
28. Dan Bakkon.

PELO KING

29. Ugari.
30. Saka.
31. Mohamman Baka.

5.—*Kings of Gobir.*

1. Maubir.
2. Sura.
3. Tura.
4. Zinko.
5. Wadobe.
6. Yochi.
7. Gawa.
8. Boma.
9. Gazlre.

10. Wuruka.
11. Dargan.
12. Zivun.
13. Magazhi Gadi.
14. Baka.
15. Saka.
16. Baka.
17. Baka.
18. Yaka.

19. Baka.
20. Yaka.
21. Saka.
22. Gawa.
23. Al.
24. Zaka.
25. Baka.
26. Magazhi.
27. Baka Baka Gawa.

6.—*Kings of Azben.*

1. Magazhi.
2. Tura.
3. Dan Baka.
4. Yaka.
5. Yaka.
6. Magazhi Kaka.
7. Ataka.
8. Loka.
9. Baka.
10. Aka.
11. Baka.
12. Baka.
13. Baka.
14. Kaka.
15. Kaka.
16. Magazhi.
17. Magazhi Waka.
18. Baka.
19. Aka.
20. Baka.

21. Magazhi.
22. Magazhi.
23. Kaka.
24. Baka.
25. Baka.
26. Baka.
27. Magazhi Baka.
28. Waka.
29. Baka.
30. Kaka.
31. Baka.
32. Baka.
33. Baka.
34. Baka.
35. Baka.
36. Baka.
37. Baka.
38. Baka.
39. Baka.
40. Baka.
41. Baka.

42. Baka.
43. Baka.
44. Baka.
45. Baka.
46. Baka.
47. Baka.
48. Baka.
49. Baka.
50. Baka.
51. Baka.
52. Baka.
53. Baka.
54. Baka.
55. Baka.
56. Baka.
57. Baka.
58. Baka.
59. Baka.
60. Baka.

7.—*Kings of Ader.*

1. Baka.
2. Baka.
3. Baka.
4. Baka.
5. Baka.
6. Baka.
7. Baka.
8. Baka.
9. Baka.

10. Baka.
11. Baka.
12. Baka.
13. Baka.
14. Baka.
15. Baka.
16. Baka.
17. Baka.
18. Baka.

19. Baka.
20. Baka.
21. Baka.
22. Baka.
23. Baka.
24. Baka.
25. Baka.

8.—Kings of Daura.

1. Daurama.	17. Halasu.	33. Wazasi.
2. Katakata.	18. Samata.	34. Samata.
3. Dawa.	19. Ardegar.	35. Haura.
4. Zinda.	20. Wauri.	36. Wama la.
5. Rauri alla.	21. Azari.	37. Tsofo (to very away by Daura).
6. Kariya-wiya.	22. Samguta.	38. Seckin-gama.
7. Wadasi.	23. Maza.	39. Lukud.
8. Ataka.	24. Womaru.	40. Kunk-ere.
9. Samaru.	25. Iassa.	41. Neri.
10. Wama.	26. Saka.	42. Idraku.
11. Raso.	27. Idrakwanah.	43. Marama.
12. Wama.	28. Wama.	44. Zuhri.
13. Saka.	29. Samu.	45. Mohammedan Bello.
14. Saka.	30. Wasi.	
15. Adu.	31. Wama.	
16. Wazasi.	32. Raso.	

The present King of Daura belongs to the tribe of Yirimawa. He is now 61; is short, with large head; says little, and has a peculiar kind of snort. He has upwards of 30 children.

9.—Kings of Nupe.

Etsu Taro.	} Reigned at Nupke.
" Zim.	
" Zila.	
" Dala.	

1. Etsu Jia, king about 1760-85. A great warrior, and a popular king, whose reign is said to have been the most flourishing in Nupe. He built Gbani, and removed thither from Nupke; he built Iero. All Nupe, from Ebo to Dibo and Kupa, was directly under him. When he captured people he made them settle and build towns, and many of these towns still exist and flourish. He drove his relative Mazu to Yauri. He was a Mohammedan.

2. Etsu Samaza was driven by Mazu from Nupe, and fled to Igum. He died in Koton Karatu; his descendants still live in Igum; one of his sons, an old man, being now in Ajum.

3. Etsu Mazu seized the throne: he was a relative of Etsu Jia by the female side.

4. Kodo Nagari, son of Etsu Mazu; he took his mother's advice so constantly that the Nupe people said they would not be governed by a woman, and, rising against him, drove him to Yauri. He and his father's family were settled about Igugana, and when he was driven from the throne this district adhered to him, and has ever since been separate from Nupe, being known as Egwa-dugwa or Igugana-dugwa, the chief town being Tsafo. On his death he was succeeded by Muman, who first invited the Fulani to Nupe, who on their arrival found

Mamudu dead. He was succeeded by his brother Mazu; he by his relative Majin (Mama Jia), of whom more afterwards.

5. *Azaka*, more commonly known as *Yikeko* from a saying of his that "his teeth were now out and would not again go back." He was a heathen, although all his family were Moslems; his maternal grandfather having been *N'dazo*, or priest of *tienok*, a brave and open-handed, but often cruel, man; he became king about 1740. He first began the practice of selling as slaves captives taken in war. Being engaged in war on *Igwajugwa*, he lived long at *Soroge* or *Sologe*, in *Gbedagi*; he was driven to *Busa*, but returned and regained his throne. He died at *Vindugi* in *Kusoga*, near *Daba-guze*.

6. *Zimada Solo*, grandson of *Etsu Jia*, was born in *Zuma*, near *Gbara*; a tall, fine man, marked with "*bikun*;" considered a just, good king. He lived long at *Wabogi*, then moved to *Jagbata*, where he was driven by war; then to *Ragata*, where he was killed about 1810 by *Maji* and *Mallam Dede*. In his time *Mapa* and the *Fulani* first made combined war, and the latter commenced to have a footing in *Nupe*.

7. *Idriza*, or *Ibriza*, son of *Zimada*. On death of his father he fled to *Ibom*; after a time he crossed the *Kwona*, at *Obad-jibo* and made war on the *Fulani* at *Rabba*, he having his camp at *Jangi*. *Maji* was called in, and bringing war behind *Idriza*, he was compelled to fly, and settled for a long time at *Katsa*, in *Kotoko*, where he had a war camp. He died and was buried in *Gbara*. His full name was *Idriza Gara*. He was a tall, fine man, very dark, and marked with "*bikunas*." He was born in *Wabogi* in 1796.

Mapa during all this time disputed the kingdom; he was of *Etsu Mazu's* branch of royal family, and his previous title had been "*rokoji*," which had been held by his father, grandfather, and great grandfather. He called in and was supported by the *Fulani*, and he first introduced the dreadful civil war which nearly destroyed *Nupe*. He was for some time settled in *Rabba*, and after the death of *Zimada* the whole of *Kasofa* was given him by the *Fulani*. He was a stout man of yellowish complexion, and no mark; his mother was a *Kupa* woman, a slave, but good-looking. At first he was a cap-maker; he was born at *Zuma*; died and was buried at *Djuguma*.

8. *Etsu Isa*, son of *Idriza*, now represents the legitimate branch of the *Nupe* royal family. At first he resided at *Gbara*, then at *Labozh*, where he was attacked by *Onara*, and where all the old *Nupe* insignia of royalty were burned. He now lives in *Bida*, having promised not to disturb the present order of things. Several towns about *Lom* have been given to him by *Masaba*; he is about 41 years of age.

In Tsuaf, Majia was succeeded by his son Ftsu Isado, who was an active agent in taking and destroying Rabba, under Ottoman Zaki. He died in Boughi, and was succeeded by Maza, who was killed in Ifagima in Omar's wars. The present King of Tsuaf is named Sabu Idu, commonly known as Bada, he is grandson of a former king named Sabu, a branch of Majia's family, and if he dies the throne will probably be filled by one of Majia's descendants, many of whose younger sons are yet alive.

Note—The pays Tsuaf, which unites with Masaba in paying to the Sultan of Gwandu.

Masaba was driven from Rabba by Mazigi and Andu, about three years after Mallam Delo's death, or about 1836.

CHILDREN OF MALLAM DULO.

Name.	Latest Son.	Mother.
1. Mazigi	Umoro	Dulo.
2. Abushahi	Mohammed Taba	Nupe-Bain.
3. Uszat Zaki. (Died 1859)	Malik	Baina
4. Khatiba, aged, now 1844 about 60	Na	Kotofa.
5. Mostafa	Yusuf, or Tsado	Fatima & Nupe.
6. Mahamat	Danza	
7. Mohammed Saba,* Lukpon, or Musaba, (now aged 52. King of Nupe, 1864)	Yusuf	Nupe
8. Ibrahim	Lukpon	
9. Ammatu	Ras d or Tsado Zaki	Akoko

* The other names are Mohammed Saba, Maha Saba, Musaba, Idu Saba, Nda Saba.

IV.

On the Rise of the Niger and its Eastern Tributaries: from the Notes of Dr. W. B. Baikie, R.N.

At the end of June, or in the first week of July, the Kworra begins to rise between Rabba and the Confluence; it has reached its highest level by the end of September. Early in October it begins to fall, throughout November it falls rapidly, but slackens towards the end of December, and by the 1st of January is nearly stationary. From the latter part of this month, to the end of February there is a second rise of limited amount, which at Rabba varies with the season from 8 to 18 inches, and at the Confluence does not exceed 4 or 6 inches. Early in March it again falls, and steadily subsides until the end of June.

The Bine, Gwarara, and Kaluna, or Lafun, have but one period of rise, which begins before that of the main stream, and reaches its height before the Kworra has begun to fall; this ex-

mences early in April, and may possibly have caused the rise observed by Mr. Laird at Idila on the 22nd of March.

The Kworra, coming from the westward, and extending over many degrees of longitude, is differently acted on in various parts of its course.

From Yauri downwards the rains are brought by south-east and north-east winds, and to a more limited extent in September from the south-west.* In its middle part the rains have less influence, while towards its source the chief supply is brought by south-west winds in September, October, and November. The floods which, these occasions, flowing through level countries at a slow rate, do not reach Timbuku before January, when they first retard the fall, and occasion a small rise, varying in amount at different points with the width of the river-bed.

At the Confluence there is a difference in the colour of the two waters; that of the Bune is of a deep transparent blue, called in Hausa "bakyin rawa," or black water, while the Kworra, from its turbid muddy colour, is named "farin rawa," or white water; this distinction is lost when both are in flood, and come down loaded with sediment.

V.

LIST OF NATIVE VOCABULARIES OF SMALL OR BEFORE LITTLE KNOWN TRIBES.

(Collected by Dr. W. B. Baikie, M.D.)

- | | |
|--------------------------------|---------------------|
| 1. Yockan. | 10. Baga. |
| 2. Yocka. | 11. Kambake. |
| 3. Ay (at Dromo). | 12. Gade. |
| 4. Zogwa. | 13. Kacari. |
| 5. Baxari words from Zariya. | 14. Fann. |
| 6. Towari (western districts). | 15. Gulegwu or Uzu. |
| 7. Nawa (Nawari, S. G.). | 16. Uagwa. |
| 8. Katab. | 17. Zhaba. |
| 9. Wura. | |

V. *A Visit to the North-East Province of Madagascar.* By the Rev. H. MAUNDRELL. Communicated by the Right Rev. V. W. RYAN, D.D., Bishop of Mauritius.

Read, January 14, 1867.

THE north-east province of Madagascar is called by Europeans *Ichmare*, but by the natives of the country *Vohimarina* (from *Vohatra*, village, and *marina*, bay). This province is well watered by numerous streams, which, rising among the mountains of the interior, flow eastward into the Indian Ocean. The

* Between Idila and Zariya the rainy season ends on the 3rd of October.

province on the whole is mountainous, though possessing along the courses of its rivers large, rich, fertile valleys, which abound in uncultivated vegetation.

These valleys present every advantage to colonisation. They might, with a little enterprise and outlay, be easily irrigated by the streams which flow through their midst, and would thus become capable of producing almost any quantity of rice, sugarcane, and all other tropical productions. In the woods, especially those in the country around the Bay of Diego Suarez, there is much hard timber that might be used either for ship-ping or hulling purposes, while from the mountains might be obtained abundance of stone, and, according to the statements of some, iron.* I have heard and read also that coal is found on the north-west coast, at a place called Passambava, near to the French island of Nosibe.

Quartz is found in great quantities. This province is remarkable for the facilities it offers to commerce, from the magnificent harbours it possesses; as if Providence had decreed that it should yet become a seat of enterprise, commerce, and civilisation.

The chief of these harbours on the east coast are the Bay of Vohimare, Port Leven, Port Laquez, and the Bay of Diego Suarez, or British Sound. Sir Robert Farquhar endeavoured to establish a colony at Port Laquez, and sent ships there for that purpose; but the settlers were murdered by the Sakalavas, who were then far more savage and less civilised than they are now. The bays of Vohimare and Diego Suarez deserve our chief notice, both on account of their natural advantages, and from the adjoining country to each being uninhabited, while the intervening country is not except by wild bullocks and crocodiles, and a very few men, who spend their time in hunting the wild bullocks, and in taking the calves either to Ambouano or Antemboka, where they are tamed and placed with the other herds.

The Bay of Vohimare is a fine sheet of water, running inland in a westerly direction, and shut off from the Indian Ocean by a coral-reef which runs almost north and south. The entrance to it is at its south-east corner. This entrance is narrow, but of sufficient size and depth of water for any of our largest ships. If the wind is blowing from the south-east or east, there is no danger in entering; but with a strong south or south-west wind, so narrow is the passage, that in a few moments you may be on the reef.†

* I have seen inferior iron, which shows that perhaps the good may yet be found.

† Of course, this applies only to sailing-vessels.

As you enter, the town of Ibarana appears on the left, while on the west and north-west the bay is enclosed by mountains, and round its border, between the water and the above-mentioned mountains, is a belt of trees and shrubs. Thus the water of the bay, this belt of wood, and the mountains beyond, make up a beautifully picturesque view.

It is the policy of the Hovas to build their citadel some miles inland from the coast, that they may not be bombarded by French and English men-of-war. This explains why so few Hovas reside at Ibarana. They look upon this small port as a trading-place simply, and are never there in large numbers, except when ships are in the harbour, when they come and remain there till the ships are gone away.

Ibarana scarcely contains more than a hundred houses, half of which are sometimes empty. It generally contains from 100 to 200 inhabitants. When a ship is there for ballast, it presents a lively aspect. The Hovas and Sakalavas flock in from Amboanio and the surrounding country, so that Ibarana at that time may have a population even exceeding 1000. The following day, after the departure of the ships, Ibarana assumes its wonted quiet.

At the town of Amboanio, which is about one mile from the sea, eight miles south of Ibarana, and situated on a slight eminence commanding an extensive valley, watered by two streams, is the citadel. This is about an acre of land, in the form of a square, enclosed by a palisade of wood. There are a few cannon mounted at the corners of this citadel, and at its principal entrances. Within are the houses of the Governor, the officers, and soldiers, and the powder-magazine. To a European it is a place of insignificance, scarcely deserving of the name of citadel or fort or battery, though it is not too much to say that it is by means of such places built, and garrisoned by a mere handful of disciplined soldiers, in different parts of the country, the Hovas keep in subjection and rear the conquered tribes of Madagascar.

Besides this citadel or *rova* (fence, palisade), as the natives call it, the town of Amboanio comprises two other divisions: viz., the *tandana ny borizany*,* or town of the civilians, and the town of the Sakalavas (the natives call any collection of houses a town, so that there are many towns within a town). Hence, the citadel, the district of the civilians, and the district of the Sakalavas make up the town of Amboanio. This town contains from 500 to 1000 inhabitants. The population is very fluctuating, as very many of the people who have houses at Amboanio

* *Borizany* is the native corruption of "Bourgeois."

have other houses in the country at their rice-groves, and they are often away from Amboanio for months. Again, the Sakalavas, from their inveterate hatred of the Hovas and of their galling rule, prefer living in the country, and only come up to Amboanio at the annual feast, at the Sakalava feast of *Manangana Savatra* (the Feast of Circumcision), at similar great occasions, or to sell their rice. These houses in the country are severally called by the natives their *banana*; but a general name for them all, and the country where they are built, is *Anbanivolo* (*Anbany*, "under," and *volo*, "bamboo"), because many bamboos grow near them. Another general name for all these small villages, and the whole country towards the interior, is *Andoharano*, i. e., "The country about the sources of the streams," from *any*, "there," *loha*, "head," and *rauo*, "water."

It is at *Anbanivolo*, or *Andoharano*, that the natives grow the principal part of their rice, sugarcane, manioc, sweet potatoes, &c. All the houses of Amboanio, like nearly all in Madagascar, are made of wood.

The houses of the Hova officers are peculiar, inasmuch as the two gable rafters, at each end of the house, are made to cross and extend higher than the top of the roof. Those in the house of the Governor extend highest, and those in the houses of his officers, according to their rank, are either high or low. No one must make his gable rafters as high as those of his superiors.

The *Betsimisaraka*s build their houses, generally speaking, a little above the ground, a practice which they probably learned from Europeans, who are compelled when living in Madagascar, especially when living on the coast, to protect themselves from malaria and damp.

They also keep their houses very clean and neat, much more so than the Hovas and Sakalavas. This, too, may be attributed to their intercourse with Europeans. The beautifully fair countenances and the partly European features of some of them, and the many foreign tombs at Vohimare and elsewhere, lead to the supposition that many Europeans (some say old pirates) settled on the east coast of Madagascar, married native women, and had children.

The country immediately around the town of Amboanio is flat, except that between Amboanio and the sea, which is sulky, or, what we should call in England, downs. These downs are very extensive all along the coast at Vohimare, and afford splendid feed for cattle. The bullocks of Vohimare are the best in Madagascar, and fetch a higher price at Mauritius than any others.

The beautiful valley between Amboanio and the mountains of

the interior, and stretching for several miles north and south, is watered by the two streams Manambery and Fanambana; the former about three miles to the north, and the latter about three miles to the south, of Amboanjo. The soil is of a black rich nature in many parts.

At present it is covered chiefly with long grass: but, if irrigated with the waters of the above-mentioned rivers, it might be made to grow in abundance all the tropical productions necessary to make Ibarana, the port of Vohimare, a place of commerce; and then industry and civilisation would spread throughout the north of Madagascar.

The interior from Amboanjo, as in all the north of Madagascar, is mountainous; though, running between the mountains, there are large, rich, fertile, and well-watered, but uncultivated, valleys.

Many of the mountains are wooded. The *rufa* palm is seen growing along the courses of the streams that wind their way among the mountains, while the travelers' tree is found right at their summit. I was ascending one of these mountains once, with two natives: the water we brought with us was finished long before we got to the top. I began to be very thirsty, the sun was very hot. My tongue was parched, and I could not partake of some food I had brought with me without water. To my great astonishment and delight, at the very top of this mountain, growing on the rocks, were a few travellers' trees; we picked them, and out flowed the water. Such is a simple instance of the merciful provision of Providence for his people.

My object in ascending the mountain was to ascertain the nature of the country beyond.

The *rufa* palm also is of great value in Madagascar; the natives make the rafters and sides of their houses with its stems, and they thatch them with its leaves. Besides their houses, the Sakalavas make most of their *lambas* from the leaves of the *rufa* palm.

The character of the country between Vohimare and the Bay of Diego Suarez is pretty much the same as that of the country about Amboanjo. It is mountainous towards the interior, and in many places right down to the seacoast. There are also numerous and extensive valleys, well watered by numerous streams. Very little indeed, however, is known of this part of the island. As I passed through it on my way to Antomboka, I was struck with one peculiarity: all the plains and valleys are dotted over with palm-trees. The natives call this palm "*atrana*." It grows nearly to the height of the cocoa-nut tree, but often bigger in the stem, with the leaves very much like the leaves of the yakou. I should have thought it was

the vakos, but the natives knowing the vakos and calling this by the word "*satrana*," makes me think that this may be a palm peculiar to Madagascar. The following are the names of the places I stopped at during my journey.

Monday, Sept. 4th, 1865.—Started from Amboanjo about 12 o'clock, crossed the river of Manambaty, passed to the west of Ihoroma and the Bay of Vohimare, and came, about 5 p.m., to Mantialaka, a very small village of not more than six houses. It is the last inhabited place I saw till I came to the suburbs of Antomboka.

Tuesday, 5th.—Left Mantialaka at 6 o'clock a.m., crossed the river of Mantialaka, which runs close by the village of the same name. No canoe crossed, as also all the rivers afterwards, in my palanquin, borne by my bearers. At 11 a.m. arrived at the river of Manambaty. This river is not wide nor deep. Breakfasted under a few sticks stuck in the ground and covered with rough grass. Started again after breakfast, and came in the evening to Sahampano. Water not good. My bearers made me a temporary hut for the night. There were lots of palm-trees in this place.

Wednesday, 6th.—Had very little sleep last night. The mosquitoes were both big and numerous, they greatly tormented me. I was told that the mosquitoes in the rainy season even kill the calves. I was at Sahampano at the most favourable time, and yet they kept me from getting sleep. After leaving Sahampano I travelled through a country thinly covered with the palm-tree. This palm is very much like the vakos. Breakfasted at Bemongo, in a beautifully shady spot. During the afternoon I came into a valley between two ranges of hills, and saw some wild bullocks; they either saw or smelled us, and made off towards the interior. At 5 p.m. crossed the river of Manakolana. The water was up to the chins of my bearers. Rested for the night at Andringamely. Found some small huts, which persons who preceded us had made. Good water. The palm-tree continued to become finer as I went north. At this place they gave a very pleasing aspect to the scenery.

Thursday, 7th.—Slept well the night previous: no mosquitoes troubled me. Started on our journey at sunrise. Soon after leaving Andringamely we came to the top of some rising ground, where an immense valley, full of the palm-tree, stretched far away towards the interior of the country and bound it in on the north, by a high range of mountains running down to the sea-coast.

Port Luquez, which runs considerably inland, compelled us to turn our course to the north-west. We breakfasted at Aniranosahampano. The water was fair. I found the sun very hot,

passing through this valley; my men got very tired. At evening I came to a river, and found that a part of my men had crossed it before I and my bearers came up; in the meanwhile the tide had come in, and we could not cross. My bearers cooked my rice, made me a hut, set fire to the shrubs and grass to drive away the mosquitoes, and did everything in their power to make me comfortable. At midnight the tide gave out, and we crossed, without trouble, both this river and another; and at 5 o'clock the next morning I came up to the first party at Bedrakaka.

Friday, 8th.—After breakfasting at Bedrakaka we went north-east. Thus, by going north-west the day before and north-east on this day, we at length reached the inlet of the sea called Port Luquez. Had a splendid view of this immense sheet of water as I travelled along up the mountain that I had seen far off in the north on Thursday morning. In the evening arrived at a place called Ben-nevikua; it is close by the sea at the end of the range of mountains above mentioned. Good water, and a cool sea-breeze made me enjoy this place.

Saturday, 9th.—Left the previous night's resting-place at 5:30 A.M., marched through a parched country and across an inlet of the sea, when the tide was out, till 12 o'clock. Crossed Rodo, the widest river all the way up. No canoe; much difficulty in passing. If my men had not been all, I should not have got across dry. My bed was soaked, and my medicine-chest all but lost. The lad who was carrying it was being taken down the stream, when another person seized him and helped him through. Soon afterwards we came to the village of Rodo, which consists of four houses. Only two women were there. My rice had run out, and I sent men on forward to procure some.

Sunday, 10th.—Stopped at Rodo. The men who went for rice returned just soon enough to enable all to have a good supper on this day.

Monday, 11th.—Rise very early and left Rodo before 1 A.M. as we had a long journey before us. After travelling seven hours over hilly and irregular country, we arrived at a small village of about twenty houses, called Antananarivokely, or Little Antananarivo. It is situated in a plain a few hours walk from Antomboka. From this place I sent word to the Governor that I would visit him on the morrow, according to the habit of the Mahagasy people; for unless you acquaint the governor of a town of your visit, he justly looks upon your visit as an intrusion and insult.

Tuesday 12th. On this day I left Antananarivokely, and, after travelling across a plain, ascended the mountain on which Antomboka is built and entered the town.

Antomboka, properly speaking, is the name of a very small village of ten or twelve houses, situated close to the Bay of Diego Suarez; but the name is given by some natives and Europeans to the town or citadel of the Hovas, called sometimes by the Hovas *Vohitramo*, and by the Sakalavas *Antsirongy*. It is a fortress of the Hovas, built on the top of a mountain, which on all sides is defended by projecting and precipitous rocks from invasion. There are only three ways by which the top is reached, all of them exceedingly difficult. One is on the south, one on the west, and one on the east. I first ascended by that on the south side of the mountain. Just before coming to the top the only means of getting up is a ladder of from 15 to 20 feet. Having mounted that, a plateau stretches itself out before you on which is built a Sakalava town, i. e. the Sakalava portion of Antomboka. Higher up is the town of the civilians, and higher still is the residence of the governor, officers, and soldiers.

This town is so naturally and almost invulnerably defended that it forms the key to the whole of the north of Madagascar. The Hovas quite look upon it in this light; so that while scarcely a hundred soldiers are stationed at Antsirongy, quite a thousand are kept at Antomboka.

There are two small villages near which are the ports for Antomboka, as *Iburana* is the port for Antsirongy. One is called *Ambohyphala*, and situated at a small bay a few miles south of the Bay of Diego Suarez; it contains nearly a hundred inhabitants, and is the port for Arab dhows and about 8 miles from Antomboka. The other is the very small village of ten or twelve houses at the Bay of Diego Suarez.

This bay is beginning to be known by many as one of the finest in the world. It is completely protected from the waters of the Indian Ocean, and comprises five large harbours.

The scenery around is extremely beautiful; the soil is rich and the country healthy. To sum up all that is said in the preceding pages, the north of Madagascar is healthy, well watered, rich, and fertile, possessed of many materials on its soil for shipping and building purposes, and having great advantages for commerce in its fine and spacious harbours. This fine country, however, is but very thinly inhabited, and, of course, scarcely at all cultivated. The natives are quite satisfied in growing sufficient rice for their daily wants, and sufficient of sugarcane for the manufacture of an intoxicating drink called "*loaka*," but are not conscious of, and want the enterprise to work, the resources of their beautiful country. I may mention, in conclusion, that the Arabs from *Nossi-bé* the Comoro Islands, and Zanzibar, are the principal traders in the north of Madag-

guscar. They trade chiefly in gum copal and other gums found in Madagascar, which they get from the natives in exchange for cotton-prints and *slaves*. For, notwithstanding the efforts of the British against the slave-trade, several slaves are brought to Volunare under the pretence of being the sailors and servants of the owners of the Arab dhows, and then sold to the Hova officials. The influence of the Arabs upon the natives is anything but salutary.

One French gentleman, M. Guinet, lives near Amboanio, and is the agent for M. Lebrun, of Mauritius.

VI. — *On the Rivers San Gavan and Ayapata, in the Province of Carabaya, Peru.* By Professor ANTONIO RAIMONDI, Hon. Corresponding Member R.S.S.

Recd., February 25, 1867.

THE want of agreement observed in all maps with respect to the rivers of the province of Carabaya, particularly those known in the country under the names of San Gavan and Ayapata, urged me to make an expedition into these deep Andean valleys, so as to discover the real course of the rivers, from their sources in the Cordillera to their junction with the Inambari, to which nearly all the waters of the province of Carabaya are tributary.

Although the object of this memoir is to make known the course of these two rivers, namely, the San Gavan and Ayapata, which are the least known, I propose, for the better understanding of this portion of Carabaya, to make a few general observations on the province.

The province of Carabaya, so famous for its rich gold-mines, is in the southern part of the republic of Peru, and is in the department of Puno. It is bounded on the north and east by the republic of Bolivia; on the south by the provinces of Huancané, Azangaro, and Lampa, in the department of Puno; and on the west by the department of Cuzco.

A great and elevated chain of mountains, covered with snow, traverses the province from east to west, dividing it into two unequal portions. In the portion to the south of this great barrier there extends an elevated region, the lowest portion of which is more than 13,500 English feet* above the level of the sea. To the north of the same barrier are thrown out many ramifications or secondary chains, in which are found deep *quebradas* or narrow valleys, watered by as many rivers, which, uniting, form the great River Inambari.

* All altitudes are given in English feet.



In the elevated region to the south of the snowy chain lies Crucero, capital of the province, besides the smaller town of Maesani and the village of Ajoyani. In the region to the north of the great chain, and in the upper portion, or as it is called in the country the *cabeza* (or head) of the numerous *quebradas* originating there, are found situated the other towns of the province.

The town of Crucero has a very cold climate, being situated in an open plain, 13,742 feet above the level of the sea. Its temperature during the day does not exceed 35–40° Fahr., and at night in the month of August, one of the coldest, it has been known to descend to 12–20° Fahr.

An opinion may be formed of the climate of the capital of the province of Carabaya by the meteorological tables in the Appendix.

In these elevated regions the temperature varies greatly: it is sufficient that the sun be obscured by dense clouds to cause the temperature to fall considerably, as may be seen by comparing the observations of 4th October with those of the 29th of same month.

Maesani is the most elevated village in the province of Carabaya, being 14,222 feet above the level of the sea. The other towns of the province situated to the north of the snowy chain enjoy a more temperate climate than the capital, and are situated between 6000 and 11,500 feet of elevation.

Descending by the various ravines, at the heads of which the towns are built, the hot valleys are entered, where coca, coffee, sugar-cane and other products of tropical regions are cultivated. In these valleys the temperature gradually increases, in travelling towards the eastern plains, until the River Inambari is reached, which is the lowest part of the province. On the shores of this river in the month of September (the end of winter) the temperature during the day exceeded 80–60° Fahr., and during the night was 44–40°.

The upper portions of these narrow ravines do not offer many difficulties to the traveller, for although the roads are sufficiently bad, they are transitable on horseback; but if the journey is continued downward to the forests, then the difficulties begin, and one is obliged to go on foot by escarped paths, full of *mal pasos* (dangerous spots); finally, if it is desired to penetrate to the River Inambari by the *quebrada* of San Gaván or by Esquilava, the expedition is not only very difficult but even perilous, for no path whatever is to be found, and the explorer is exposed to be wounded or killed by the arrows of the Chunchos Inambari or other savages who wander about the forests.

The *quebradas*, the description of which is the object of this memoir, are situated in the western part of the province, and the

rivers that flow down them have different names in different portions of their course. As all the maps and descriptions hitherto published relating to the course of these rivers are more or less incorrect, I will here give the results of my observations.

The river known as San Gavan, in the province of Carabaya, has its origin to the south of the Cordillera Nevada, by the union of the stream that passes by the town of Macusani with that which goes by the town of Cerani. The river thus formed traverses the Cordillera Nevada by a narrow and deep pass; it then runs by the foot of the town of Ollachea. At 5 or 6 leagues lower down it receives an arm from the left, which descends from the caserios or habitations of Chiza and Quihu. At this point it commences to take the name of San Gavan, which it preserves until it joins the Inambari.

In a work published in Paris in 1861, '*Scènes et Paysages dans les Andes*, the author, who signs himself *Paul Marcey*, gives an account of an expedition he made by the *quibrida* of Marcapata, in search of the town of San Gavan, and says that the River Ollachea unites with that of Marcapata; which is absolutely false, for I have followed and personally seen the junction of the River Gavan and the Inambari.*

The River Ayapata, less powerful than the preceding, rises in the Cordillera Nevada or elevated Andean ridge, already mentioned as dividing the province of Carabaya into two parts, and descending towards the north, passes by the town of Ayapata and takes the name by which it is here designated. One league farther down it joins the Ituata, which enters from the right; it then receives other rivers, and passing by the *tambo* (traveler's resting-place) of Esquilaya, changes its name, being known from this point as the River Esquilaya, which it preserves until it enters the Inambari, without reuniting with either the Ollachea or San Gavan.

On the 16th August, 1864, I left Crucero to visit, first, the head-waters of the Ayapata and Ollachea, directing my steps towards the town of Macusani, a distance of 13 leagues N.W. by W. The road goes to the right of the River Crucero along a considerable plain covered with small graminaceous plants, in the direction of an elevated mountain called Kenanari. Some three leagues from Crucero the plain is left, and, retiring from the river, an ascent is made so as to cross some ramifications of

* Marcey's work contains many other inaccuracies, and should be looked upon as the product of a vivid imagination, rather than as a truthful composition. It is to be lamented that so able a writer, and one who has had the opportunity of visiting unexplored regions, has employed his talents in a work of such a nature, deviating so much from the truth, when he could, by faithfully describing countries so new as Peru, have interested the readers much more than by fantastic stories.

the great Nevada chain, from which descend several streams tributary to the River Crucero. The march is continued among mountains until the *Caserio* of Ajoyani is reached, placed in an open plain at 13,555 feet above the level of the sea. At this place several streams unite and form a small river, which runs also into the Crucero.

From Ajoyani there is a continuous rise, passing near and to the right of the snowy peak of Kenamari which consists of trachytic rock, and forms part of a transverse chain which unites the eastern and western cordilleras forming towards the west the great mountain knot of Vilcanota. The most elevated portion of the road is 15,911 feet above the level of the sea, and serves as the watershed between the streams that descend to Lake Titicaca, and those that flow towards the Atlantic. From this point a most beautiful and imposing panoramic view is obtained. On the right is seen the vast extent of the elevated Cordillera Nevada, with its immense masses of eternal ice, dominated by the huge mountain known as *Allin-Chapac*, very little inferior to the famous peaks of Sorata and Illimani, found to be in the continuation of the same chain, and belonging to Bolivia. On the left is observed another chain, projecting here and there in icy peaks; these belong to the already mentioned Vilcanota knot.

Continuing our journey, a descent is made to a plain extending between the two chains of snowy peaks, on both sides of which descend various streams, so as to form the small river that passes by Macusani, which, as we have said, unites with the Corani, and forms the river Ollachea, or San Gavan. Thus all the waters that flow down into the plain of Macusani cross the Cordillera Nevada to go to the Inambari.

The town of Macusani is on the right bank of the stream, and at an elevation above the sea of 11,223 feet. The business of this town is the preparation of *Chalona*,* which is its principal article of commerce with the other towns in the province. It was in this town that the *Cum* Cabrera twenty years ago obtained *mestizos*, or hybrids from *vicuñas* and *alpacas*, of which at the present time there may be some seventy in existence.

Macusani, although situated at a greater elevation than Crucero, has not a colder climate; this is owing to the circumstance that it lies in the bed of a *quebrada*, and not in an open plain like Crucero.

As there is no road to Ollachea along the banks of the river

* In Peru *chulona* is the name given to mutton that has been salted and dried, or rather to the whole sheep. In Macusani *chulonaz* are prepared without the bones; these are called *salpensas*.

at the point where this cuts through the Nevado chain, I decided to go from Macusani to Ayapata, so as to visit the source of the river Ayapata, and thence pass to Ollachea, traversing an elevated ramification of the Cordillera which divides the ravines of Ayapata and Ollachea.

The town of Ayapata lies nearly north from Macusani, and the road has a general N.E. direction to the summit of the Cordillera, and from this point to Ayapata N.W.

Leaving Macusani, the plain lying between the two chains is crossed; there is then a continual rise straight to the eastern Cordillera, which appears to the observer as a high and impenetrable barrier; but on nearer approach, it is seen that the land is elevated gradually, and only in the highest part is there much inclination.

One and a half league from Macusani two small lakes are passed, and a little farther on, at the base of the Nevado, another lake is skirted, called Socallacocha, the blue waters of which pass to the other lakes to form a small river, which goes to Macusani.

The most elevated portion of the road is distant from Macusani three short leagues, and the pass of the Cordillera is not at much elevation, because the road passes through an opening between the icy peaks that rise on each side. The altitude of the pass is 15546 feet above sea-level, being lower than the one on the road from Crucero to Macusani, which connects the ramification of the Cordillera of Vilcanota, the eastern Cordillera forming a sort of knot.

Arrived at the culminating point of the road, the track forms a sinuous path, skirting some small lakes, after which the descent soon commences.

There is little or no vegetation on the summit of the Cordillera, it being reduced to such plants as the *Jareta* (*Azerella crenata*, Pers.), which grows among the rocks; the *Geranium sericeum*, Will., and the *Senecio humilimus*, Schultz. But it augments as we descend, when the *Senecio calcitruus*, Schultz, *Senecio Ayapatenis*, Schultz, and the *Bouleria lobata*, R. and P., appear. A little lower down commences the cultivation of the potato, and a few huts are seen here and there. Vegetation continues to increase, and the following plants are seen growing:—*Plantago sericea*, R. and P.; and *Gnaptalium melanospermum*, Schultz; *Merops* Schultz, Wedd.; *Lomatium Lechleri*, Wedd.; and some *Lupinus*, *Medicago Oldervian*, *Calceolaria*, *Chato-gutza*, &c.

The road is now a little better, along the edge of a river formed by the streams descending from each side; dwellings become more numerous, cultivated lands are of greater extent,

and some trees of *Berberis monosperma*, R. and P. and *Agapertensis*, Secller, with bunches of flowers of a beautiful yellow colour, give some life to the scene.

In this quebrada are cultivated, the potato (*Solanum tuberosum*, Lam.), and the *Isiro* (*Tropaeolum tuberosum*, Lam.); the inhabitants manuring the land with the ashes obtained by burning all the branches, sticks and leaves they can collect.

After having progressed a little more than three leagues from the *Cumbre*, or summit, a river is passed nearly equal in size to the one followed hitherto, and which descends from the Cordillera that divides the towns of Ayapata and Ollachea; then soon commences the ascent to Ayapata, distant about half a league.

Ayapata is one of the better people'd districts in the province; its population in 1862 being 2369. The town lies 11,826 feet above the level of the sea; it has a square plaza surrounded by small trees of *Sauce* (*Samlucus Peruvianus*, Despland). On one side of the plaza there is a large house belonging to Señor D. Agustín Arragon, the owner of an estate in the valley of San Gavan, where sugar-cane is cultivated for the manufacture of aguardiente.

The town of Ayapata is subject to *neblina*, or mist, generally towards the evening. It is so dense that objects are not to be distinguished at a few paces off, and it intercepts the light to such an extent, that in the houses artificial light has to be resorted to early in the evening.

Nearly all the towns situated on the eastern slope of the great chain, and between 8000 and 12,000 feet above the level of the sea, have this inconvenient visitation of the *neblinas*.

The phenomenon is owing to the currents of air being in one direction during the day, and in another during the night, thus forming a sort of atmospheric ebb and flow. In the morning the elevated portions are free from mist, and on the contrary, the lower and hot parts are filled with a dense stratum of vapours, which, seen from above, looks like an ocean of cloud at 6000 feet.

The elevated portions of land being at these hours exposed to the first rays of the sun, are heated, and a current of air from the lower and hot parts is thereby caused. The sun at the same time gradually heating the lower region, and evaporating a large quantity of water, the air becomes charged with vapours, and the aerial current which has been established from below upwards, goes on taking continually new vapours towards the elevated parts, which go on accumulating; but as the sun's action has heated the atmosphere of this region the vapours become dissolved in the air, until the evening, when the

atmosphere becomes cold, and then the vapours are in part condensed, and become visible, appearing in the form of *neblina*, or mist, which becomes more and more dense by the accumulation of the vapour that comes from below. Night arrives, the sun's action has ceased, the atmosphere gets colder even in the lower parts, and then commences a contrary current, to establish atmosphere equilibrium, filling the void produced by the dilatation of the air by the action of the sun during the day. Moreover, the aqueous vapours suspended in the atmosphere of the elevated regions, in consequence of the lower temperature of the night, are condensed into water, which falls upon the earth, and the air becomes dry, so that by the morning the elevated parts in the dawn are free from mist. These constant mists cause the climate of Ayapata to be very damp, producing a disagreeable sensation.

At the foot of the town of Ayapata passes the river which we have already mentioned as originating in several lakes in the Cordillera. At one and a quarter league from this town it receives another small river, called Yungamayo, and one league lower down, from the right, the river Ituata.

The 21th August I left Ayapata, directing my steps towards the towns of Ollachea and Corani, so as to discover what rivers were tributary to that of San Geron. The distance between Ayapata and Ollachea is 7 leagues, and the road consists of a long ascent and steep descent. The first portion of this road—that is, from Ayapata to the culminating point of the ramification of the Cordillera separating the two towns—is not very bad, but from thence to Ollachea it is very bad, being a succession of steps descending to the river.

Nearly the whole way the direction is easterly. The river of the *quebrada* passes half a league before arriving at Ayapata, coming from Macuani.

Leaving Ayapata, a journey of 1 league brings us to a lake half a league in length. A little further on the road becomes more inclined, and traverses a district of metamorphic slate formation; below, to the left, another lake is visible, the waters of which have a milky appearance. Continuing the route, another lake is skirted, and journeying onwards the way lies over granite rock which intervenes across the slate. On ascending vegetation diminishes, and, at a certain elevation, is reduced to a few clumps of *Gentiana prunifolia* and *scilloides*.

Some 3 leagues from Ayapata the ground becomes more broken and, passing near to two other lakes, the ascending path lies over layers of slate nearly vertical. The most elevated portion of the road is then reached, 15,043 feet above the level of the sea.

From this spot the descent commences by a narrow path over very rocky ground, to the quagmire of Olluchel, a vegetation that had nearly disappeared, returns little by little, when various bushes appear of *Hesperomorus*, *Croton*, *Isodon*, *Baccaris*, *Aralia*, *Guy Lussaria*, and *Monnina*, and which lower down these plants are replaced by others of large growth, of *Valeria*, *Mirsine*, *Bocconia*, *Chaetozandra*, &c., the luxuriance of which increases until the town of Olluchel is attained, which gives its name to the river.

Ullashe is a small place, built on a tract of level ground elevated a few yards above the river, and sits but above the level of the sea. It enjoys a temperate and healthy climate, and is not subjected to the diseases of Abyssinia. Its atmosphere is, nevertheless, rather damp, favouring vegetation very much, so that the public square and streets are covered with a carpet of green, composed principally of a species of *Senebiera*, called *Añemera*, and a small *L. pruri*.

In the vicinity of the town is found a warm spring, rising out of a formation of limestone, gneiss, and vertical layers. The water has no colour, is transparent, and has a slight salt taste. Its temperature when it issues from the rock is 40° F.

The river Chichela, which, lower down, takes the name of San Gaván, issues from a narrow gash, which widens a little near the town and afterwards again becomes narrower, continuing its course between rocks.

The 21st August I left Olloch on the banks of the
and Quilo, with the object of examining the sources of the
other rivers that form the San Juan River union with the
Ollachea.

[illegible]

Culeitium glaciale, Meyen and Walp., *Perezia nivalis*, Willd., and some clumps of *Azorella*. The most elevated part of this road is 15,700 feet above the level of the sea.

After journeying a long distance between snowy peaks a lake is skirted, and after crossing several times a stream which comes out of this lake and descending a considerable incline, the *caserio*, or village of Chia, is attained. Many streams descend from both sides into the quebrada and are crossed on the way.

The river Chia, formed by the union of all these streams, 2 leagues lower down unites with another coming from Quicho, and then flows onward to the river Ollachea, incorporating itself with this last 5 leagues below the town.

Chia is a collection of habitations, 11,440 feet above the level of the sea, and consequently in a cold climate. The inhabitants are employed in the breeding of *garudo*, or cattle; they grow the best and largest potatoes in the department.

In the vicinity are to be seen the ruins of an ancient town of the times of the Incas, and the *andenes* (or hanging gardens built on the slopes of the mountains by the old Indians) are still used.

The geological formation of Chia is Silurian slate.

From Chia to the *caserio* of Quicho is less than 3 leagues, the road ascending as far as the source of a stream along which it runs, and then descending on the other side to the ravine of Quicho. This valley has a more powerful stream than that of Chia; the two unite 3 leagues below the *caserio*, and flow onward, as before mentioned, to the river Ollachea.

The villages of Chica, Quicho, Palca, and Yvipata form a part of the district of Ollachea and take the general name of Asaroma, which has been erroneously placed in some maps as that of some town. The lands of the Asaroma produce the best potatoes in Peru.

The villages of Palca and Yvipata are situated in other ravines, the waters of which do not enter the river Ollachea, and it is believed that they join the Marcapata in the department of Cuzco.

Quicho lies 12,667 feet above the level of the sea, and between two streams, which join near the chapel with another that descends from the heights of Palca.

From Quicho to the town of Corani there are 7 leagues of road in a south and south-east direction. Leaving Quicho, there is an ascent by a small ravine following a stream to its source. Two leagues from Quicho we reach the most elevated point on the road, 15,361 feet above the sea. This point serves as a divisional line between the waters that flow downwards into the Quicho River and those that go to form the Corani.

From the highest point of the road there is a descent to a plain containing three lakes; the first is very small, the second half a league in length, the third the smallest. These three lakes are the sources of the river Corani, but the road does not lie along its banks because the stream passes through a very narrow ravine; the path is therefore over the heights, thence descending to the river at a short distance from the town, which is entered passing over a stone bridge of one arch.

Corani is a small town on the right side of the river, and at the foot of a formation of trachytic conglomerate. Its climate is rather cold, being at an elevation of 13,974 feet above the level of the sea. This plain is very badly supplied, and its inhabitants cultivate only potatoes and rear a few cattle.

The river Corani, at 2 leagues' distance farther down, or below the town, unites with that which comes from Macusani, and, joining, forms one river, which runs in a deep ravine, cutting through the Nevada chain; it then passes by the foot of the town of Ollachen, flowing towards the interior, and farther down receiving the name of San Gavan.

After having visited the sources of all the rivers which by their union form the Ollachen, I returned to the town, with the intention of travelling down the river as far as possible.

From Corani to Ollachen the distance is 6 leagues, 3 of which are a continual ascent until perpetual snows are reached; the other 3 form a descent to the town. On this route is passed the mountain of Ucutaya, celebrated for its rich silver-mines, discovered at the beginning of the last century. At present they are abandoned in consequence of the works having fallen in and killed several of the miners.

The river Ollachen runs through a ravine so narrow that in many parts there is no room for a road; consequently, in following the course of the river it is requisite to walk along a very narrow and sloping path, far above the river continually ascending and descending. Some few leagues farther down, the ravine becomes still more precipitous and the path disappears, so that there is no possibility of passing along the course of the stream. At present a distance of 4 leagues only can be reached, as far as the points known as Tavipira and Chiani.

In descending the narrow valley, vegetation rapidly becomes more luxuriant, and the variety of the flowers would add to the beauty of the best gardens. A short distance from Ollachen the lovely *Amurella reginae* grows wild, besides the elegant *Canna erulifolia*, several beautiful species of *Thibaudia*, Gay, *Lussonia*; *Gaillardia brachiotrys*, Willd. and *vaccinioides*, Griseb.; *Vaccinium peruvialloides*, Griseb.; *Cypripedium*, R. and P.;

Nerodiphyllum regulatum, Poiv.; many species of *Piper*, *Philodendron*, *Aralia*, *Momina*, &c.

Rather more than two leagues from the town the ravine appears as if it were completely closed by a high wall, of more than 200 feet in height, formed by almost vertical layers of limestone, and in a direction transverse to the river. Behind this gigantic natural wall are seen the mountains, covered with forests, and a stream that comes falling from a height forms cascades of white foam, giving life and beauty to the sombre green hues of the forest scene.

At this point the river describes a curve, and runs across the vertical layers of limestone by a sort of narrow pass. Further on the path becomes narrower, and follows the margin of the river, the water of which oftentimes covers the path, until arrival at a spot where the valley becomes a little more open, and forms the Pampa of Chuani. It then closes in again a little further down, and the road terminates.

The Pampa or Plain of Chuani is somewhat low, being 6115 feet above the level of the sea.

Although the River Ollachea, as we have already observed, is the same stream that lower down is called San Gaván, it is necessary, if we wish to follow the course of the San Gaván, to return to the town of Ayapata and take another road, there being no path below the Pampa of Chuani even when on foot. Thus, after having descended by the quebrada of Ollachea as far as I could, I had to return to Ayapata, and take the road that enters the Valley of San Gaván. On the 30th August I left Ayapata for this valley.

Leaving Ayapata, the general course is N.W., descending to the River Yungumayo, the waters of which at a little distance join the main stream, that is, at a little more than a quarter of a league from the town. An ascent is made on the other side until arriving at a height called Apashecta de Ences, one league from Ayapata. There is next a descent, and subsequent ascent, and many streams are crossed which form a river, which, far in the interior, joins the Ayapata or Esquilaya, under the name of the Quilabamba. The ascent continues as far as an elevated point called Alto de Compuensi. From this height there is a descent passing two other streams, which, like the former, take their waters to the River Quilabamba. Near the last stream there is a shepherd's hut and the spot is called the Vaqueria. From this point all the streams passed flow downwards to the San Gaván. In these elevated regions there is not much vegetation, but the following, among other plants, were noticed:—*Engelmannia hirsutiuscula*, W.; *Rimacudus Gusmanni*, Humb.; and some *Gentianas*.

From the Vagueria the track continues, skirting rather undulating country, and descending some two leagues to the ruined Tambo of Sachapata. Near the tarolo a large stream is passed, and continuing on for a few cuadras we come to the tambo of Qutenquinton, where the night is generally passed.

In the province of Carabaya the name of Tambo is given to the thatched or covered resting-places, constructed in the uninhabited regions, which serve to shelter the traveller from the inclemency of the climate, at least during the night.

In nearly all the narrow valleys in the province of Carabaya the first tambo met with descending from the Cordillera to the hot valleys is called *Sachapata*, a Quichua word equivalent to "portal of the forest;" now *Sacha* in Quichua means forest, vegetation, a wood, &c., and *pata*, a small and elevated plain, namely, a tall-land. This word *Sachapata* indicates the point where the sterile and cold elevation ends, and where vegetation commences. Consequently in all the *quebradas* of that region the place denominated Sachapata indicates the entrance to the luxuriant wooded valleys.

From all the points of Carabaya that have this name, when the atmosphere is clear, the most beautiful views are obtained, and the most enchanting panorama imaginable is presented at the feet of the traveller. A sea of green foliage springs out before him, embracing a vast extent of country, extending to the great forest-covered plains in the distance, through which wind the numerous rivers in serpentine courses.

But, unfortunately, this magnificent sight can seldom be observed, for dense white vapours cover these immense tracts and the traveller only sees at his feet a vaporous ocean, out of which here and there are thrust up, like small islands, the summits of mountains covered with vegetation.

The tambo of Qutenquinton is 10,973 feet above the level of the sea, where it is still cold. It is in the form of a large rectangular apartment, with stone walls, and built in an open place, covered with small plants of *Hesperomelus* and of *Vaccinium floribundum*.

A few paces from the tambo commences a very steep descent by a narrow cutting, the sides of which are covered with verdure. Ferns and Lycopodiums soon make their appearance, followed by Cissias, with their fleshy leaves, and the *Macrorhynchon corymbosum*, remarkable from its large leathery leaves.

The road as we advance becomes very bad, consisting of stone steps, for the most part very unequal, so that long distances have to be travelled on foot.

The vegetation continues to wear an alpine appearance; all the trunks of the trees are covered with mosses and hepaticas.

and now and then a small tree of *Chinchona ovala* is noticed.

At a good league's distance from the Tambo of Quitonq upon another shelter is reached, called Sachamacara; it lies 5082 feet above the sea-level.

From Sachamacara the road continues by the ridge of a mountain in the midst of tree-ferns, *Clusia*, *Serodaphyllum*, &c. At the sides of the road numerous mosses and lycopodiums cover the ground, and in the midst of this carpet of cryptogamic plants, peep forth shrubs of *Viola acacna*, *Bomarea*, *Vaccinium*, *Perrettia*, &c.

After one and a half hour's march from the tambo of Sachamacara we arrive at Cerakunca, whence there is a magnificent view of the great sea of foliage.

Another league lower down is the small tambo of Tatanara, situated in a small opening surrounded by thick forest. The climate here is temperate, the place being situated 7113 feet of elevation above the level of the sea.

From this place we descend to the tambito of Huayru-kunca, observing in the road a few plants of *Cudrosia*, *Tafelia*, *Erythrina*, and *Chinchona coccinea* (?).

The tambo of Huayru-kunca is 4131 feet above the sea-level, and in its vicinity are seen many small trees of *Cascarilla maynifolia*, Wedd. The heat is now becoming more and more felt, vegetation is more luxuriant, and trees are now observed of considerable size.

Progressing onwards, the elegant *Cecropias* begin to appear, with their broad leaves like parasols, and also *Heliconias*, with their beautiful bunches of tri-coloured flowers, and aquatic grasses of the *Banbasa* group.

The land becomes more level, and now some cultivated coca patches are seen, and there is presented for the first time to the sight the Rio Grande of San Gavan, at a point called Chacamay, about a league from the last tambo. From Chacamay to Sangari is half a league at which place in other times there was an estate, now abandoned.

Sangari is 2909 feet above the level of the sea, in a climate where coca, sugar-cane, and coffee, can grow. In the vicinity are observed beautiful *Siphocampylus*, *Sida*, *Amarullis*, *Chinchona Boliviana*, Wedd. and *Purpurea*, Pav.; *Laplacea Quinderna*, Wedd; and a fine *Rubiacea*, with rosy *Bractea* belonging to the genus *Howardia*, recently created by Dr. Weddell, in honour of the celebrated English Quinologist Howard.

Leaving Sangari, a river is passed which comes from Saca, after which the route is by a very bad and narrow road, excavated in compact metamorphic slate.

At a short distance is seen a river, which comes in from the opposite side to that of San Gavan; then some streams are passed which fall over rocks; we then arrive at the tambo of Pacafusi, one league from Sangari.

The Tambo of Pacafusi is very small; it is on a beautiful plain, where there was formerly an estate, but where a plantation of coca is now all that remains. In the neighbouring wood there are some coffee-bushes and plantains that have become wild. The land of this estate is very stony, which appears to have been the reason of its abandonment.

Leaving Pacafusi some streams are passed, then the great river of Yuracaca, which joins the San Gavan at a few hundred fathoms of distance. The River Yuracaca descends from the heights near to the tambo of Sachapata, receiving in its course a multitude of streams, and when it increases by reason of the freshets it is impassable. Generally there is here a poor sort of bridge composed of sticks; but when I was there I had to cross the river, attended by danger, by fording.

The road is continued on the other side of the river by a narrow pass, passing some streams, and progressing at times through the dark forest, at others over clear country, until I reached the hacienda of S. Jose de Bellavista, one league from Yuracaca.

This hacienda or farm belongs to D. Agustin Arragon, an enterprising and intelligent man, who at various times has entered these valleys, now collecting cascarilla, now marking lavaderos of gold in the River Piquituri, now collecting *Juba* or India rubber, to make clothing impermeable to water. His exertions, however, have not been repaid with much profit.

The farm of Bellavista was founded some twenty years ago; sugar cane is cultivated, from which treacle and spirit are prepared, and sent to Ayapata for sale.

This spirit or *Aguardiente* is forwarded in tinned copper vessels, two of which holding, say fifty pounds' weight, are carried on a mule.

On this estate are cultivated, besides corn, coffee, pine-apples, and Indian corn; this last serving as bread for the peons or labourers, who come in to work, and which is sold to them for about five shillings the 25 lbs.

The labourers who work here are Indians from the towns of Ayapata and Ituata, hiring themselves for thirty working days at about two shillings a day. If these labourers are economical and take their own provisions, at the end of thirty days they receive 15 dollars, or a coat &c.; on the contrary, if they receive provisions from the farm, which consists of *Chalona* or dried

mutton, sell at about five shillings the sheep, maize, chuno, &c., the value of these is subtracted from their 3*l*. per month.

The valley in which the farm of Belavista is situated is called San Gaván, in consequence of a groundless tradition that there existed once in the vicinity a very rich town of this name teeming with gold, and that it had been destroyed by the Chunchos or savage Indians. Although there have been writers who have even stated the very day on which the invasion of the Chunchos took place,* I do not believe such a town ever existed.

It is true there once existed a small province named San Gaván, which a long time before 1767 was joined in part to that of Carabaya, in part to the province of Icahuaja (now Bolivia), to Azangaro and Lampa; but this does not imply that there existed a town of this name.

There are no grounds for believing in the existence of such a town of San Gaván, but various maps give this name to a river; for example in a small MS. map in the Museum at Cuzco, the date of which is not known, the name of San Gaván is given to the river Olachen, as it is at present actually known there. In Carrasco's map of 1831, the River San Gaván is the same as the Huamhuari, the source of the Huamhuari. In another old map, which belonged to the late cosmographer of Peru, D. Edmundo Carrasco, which I possess, are to be seen marked the old missions, abandoned for many years, and there is observed written *Valley of San Gaván*, in the region traversed by the rivers Olachen and Ayapata, but in none of the maps have I seen any point fixed corresponding to the existence of a town. Lastly, in Alcedo's dictionary, published in the last century, there are even given the boundaries of the province of San Gaván, which do not correspond with the position of the valley of San Gaván placed on the maps.

All these contradictions make me doubt in the existence of a town called San Gaván. I believe that this imaginary town has been confounded with the Apurima, which is proved by documents not only to have existed, but to have been very rich in gold, and to have had a large population. Still this town, as well as that of San Juan del Oro, have not been destroyed by the invasion of savages, but by the slow decay of the mines.

The farm of Belavista is in a beautiful plain, on the right bank of the river called San Gaván, and 2,442 feet above the level of the sea.

* M. Paulo Marcoz in his '*Señales de Andes*,' says that during the night of the 15th to the 16th of December, 1767, the town of San Gaván was created and destroyed by the Carabaya and Sacastrunk Indians, which is but a dream of his imagination. It is to be deplored that such worthless and conscientious authors have done so. Mr. Markham, in his important work '*Travels in Peru and India*,'

There are here no venomous animals as in other places; jaguars and other beasts of prey also are not found; so that dogs may be kept, which is not the case in the forests of Chanchamayo and Huancayo, where dogs find unpeaceable enemies in the wild animals of the feline genus. Sand-flies are not abundant, but there are plenty of mosquitoes.

A pest, common to other Peruvian valleys, are the swarms of bats, who suck the blood of man and beast; thus it is found impossible to keep animals for the saddle or for burden, or cattle of any sort, for they become thin in a few days. Each beast will receive two, three, or more bites during the night; besides the blood this bat sucks a large quantity runs from the puncture, so that the animal loses more blood in a night than it can reproduce by its scanty food.

The absence of cattle and fresh meat renders it difficult for the labourers to exist here for any length of time without falling ill, and it is for this reason they only contract to work for thirty days.

In nearly all the forest portions of Peru, and when there is a scarcity of fresh meat, the labourers are exposed to contract an illness they call *Upitarion* (of lousis or distention), a species of *anemia* or want of the plastic matter of the blood, manifesting itself in paleness of the countenance, a discolouration of the gums, loss of strength, and at times by general swelling (*anasarca*). The labourer attacked with this disease cannot work at any employment.

The farm of San José is the last civilized settlement before reaching the country peopled by savages in the province of Carabaya, consequently it is exposed to be attacked and destroyed by these barbarous neighbours, indeed the Chunchos Indians have invaded the farm and killed people. A few years since a party of savages came and encamped at a small station named Chayapi, half a league from San José, with the intention of assaulting the latter; but a gun casually fired off put them to so rapid a flight that they left their bows and arrows on the road. In 1851, when D. Andrés Roberite was administrator, the Chunchos came to San José and killed a woman. In 1852 they made another attack, and killed with an arrow a labourer named Basilio Zarate.

The Indians who descend to work at the hacienda of San José hold the savages in great fear, and suppose every now and then they hear the cries of the Chunchos on the other side of the river, or see the smoke from their fires. Indeed, it is with difficulty that labourers are obtained to work on the hacienda.

Being desirous to ascertain the exact point where the San Gavan entered the River Inambari, I endeavoured to find

among the labourers of San José some who had the courage to accompany me. With some difficulty I obtained Indians to convey what was necessary, and a youth named D. Juan de Mata Riquelme, who had been administrator of the hacienda, volunteered to accompany, and share the sufferings of every sort to be encountered in so hazardous an expedition.

Those only who have explored the dense forests of Peru, in so broken a country as this of Carabaya, can form an idea of the difficulties that present themselves. In our case was to be added the risk of meeting a party of the savages who live in the neighbourhood.

I left San José on 7th September, taking provisions for fifteen days. Marching on foot by a narrow path, which continues only to the little abandoned farm of Cayapi, and a league distant, we passed on starting the river Uluquimayo, which had but little water.

The road runs at a short distance from the river, which at this point has a strong current, and forms large waves.

Among the trees I observed were the *Chenopodium purpureum* (Pav.) and the useful *Cordia alliodora*, R. and P., from the tender leaves of which is prepared the material of which the Guayaquil hats are made. This plant has different names, according to where it is found in Peru; in Carabaya it is called *Rimio*.

Half a league's distance is Cayapi. There are no residents, but a coral, and a thatched habitation for its owner at the time of the coral harvest, which is called the *Mita*.

On leaving Cayapi all trace of a route disappears. At a few steps' distance a large stream is crossed, then the shore of the main river is followed. We had not gone many furlongs when a great obstacle presented itself which completely impeded our march; there was an end to level ground, and the river washed the base of a high *barranco*, or escarped naked rock.

The river being wide and not fordable, it was impossible to cross to the other side, and we had no help but to climb the precipice. Two of the Indians, who were old Peruvian bark-hunters, and accustomed to such obstacles, began to construct a ladder of branches of trees. All laid down their tools and shared in the labour; some cutting with their *machetes* the long pieces for the sides, others the short ones for the steps, while others, again, sought for manes called *Mura*, to serve as ropes to bind the ladder together. In a moment the uprights were placed in position, the first steps were then fixed, and climbing on this the others were tied, one after the other, until the ladder was completed. But as the *barranco* was very high, and the ladder did not reach the summit, it was directed to an overhanging

ledge of rock. The Indians climbed the first ladder, taking materials up to make a second which should reach to the top—a perilous operation. The Indians loaded themselves, and began fearlessly to climb by hands and feet; we followed, and got safely to the top. We then continued our route through the forest by a declivity so steep that we were in danger of sliding off into the river. We made but one league to-day, passing the night on the shore of the River San Gavan. As a protection from the rains during the night, the Indians constructed a *ramada* or hut of branches, covering it with leaves they may find at hand, even making it water tight. It is astonishing to observe the dexterity with which they construct these ramadas; accustomed to deal with nature, they know how to take advantage of everything. The forests afford all they require. They are thatched in Carabaya with the leaves of a palm called *Cano*, a species of *Markea*, which they split longitudinally down their leafstalks, placing them in such a manner that the ends of some cover the bases of others, like a roof of slates. In nearly all the forests of Peru they generally use the leaves of the *Phytolapha macrocarpa*; but in Carabaya this palm is not known, so the *Cano* is substituted.

The thatch being laid on, the ground is strewed with the same leaves, which serves as a bed and keeps the traveller from the damp earth.

To-day we continued our march, following the course of the river, without diverging much from it, but, as the ground was very broken, we kept as much as possible to the very brink of the river; but when any obstacle presented itself we had to enter the forest, the Indians first with their machetes opening the way. Our course varied continually; we went north-east for some furlongs, then east, and so on.

After going still a league another steep cliff was encountered and the same system of ladders was resorted to, descending to the river, when our march for a few furlongs was to the north.

The geological formation is slate, in places visible in nearly vertical layers. Vegetation is exuberant, and the branches of the trees and shrubs so interaced that they form a thick network requiring the machete to clear a path. Many species of *Croton* and *Pharmitococca* throw out roots which, coming down from elevated branches to the ground, throw out other roots, and these become so many trunks; one plant thus at times covers a large space of ground, presenting itself under the most capricious forms. Many species of the same genus *Croton* are useful; some, known under the name of *Layo*, have a strong fibrous bark, which is made into ropes by the Indians; others produce *Jaba*, or India-rubber. There are

innumerable species of palms, tree-ferns, caneas, *Cecropias*, *Erythras*, *Cedrelos*, *Oleandras*. They grow so near to each other that the branches interlace and form a compact thicket, difficult for the sun's rays to penetrate; thus in some places our march was in darkness.

After having again descended to the river, the course was northeast for some furlongs on even ground through a wood known by the old Castaneros as the Pampa de Molina. Then came Machichacama, where are seen some holes in the rock composing the bank of the main river, and it is thought that in older times there was a bridge here; still, excepting the holes, which may be natural, there is no positive information to go on.

A small river and some streams are passed. Continuing on south-easterly direction and over slate-rock and a little further on we camped for the night, having only made two leagues during the day.

We continued our route to the south, the river forming a curve at the base of a mountain. A small stream was passed, and the main river was followed, running between banks of slate in nearly vertical layers. During freshets the river rises two yards higher than it is at present. Now and then we saw small islands in the river covered entirely with vegetation.

At a short distance the direction varies to southwest, and after some changes the bend in the river ceases, and the route then lies northeast again. We had great difficulties in making our way through the forest.

After having marched nearly a league, the direction continually varying, we arrived on the shores of the River Piquituri, which in the dry season has but little water, but is unfordable during freshets. The sand of this river is auriferous, and, higher up, works were commenced having for object to give the water another course, so as to extract gold from the bed with greater facility. Don Agustín Arragon, owner of the farm of San José, having discovered the remains of these works, was induced to continue the search for gold in this river; but, in consequence of the great difficulties that presented themselves and the little profit, the work was discontinued.

There is no doubt but that the River Piquituri contains gold; for my followers, having washed some of the sand, took out particles of the metal.

We then forded the Piquituri near to its junction with the San Gavin, which here runs nearly east and west. After a quarter of a league's march we entered land covered with spiny sarubs so close to each other that they opposed an impenetrable barrier, and it cost us much trouble and time to get through this vegetable wall.

No sooner had we got out of this sort of trap, when a dangerous pass presented itself, where a portion of a mountain had fallen into the river, with all its load of soil and vegetation; the incline by which we had to descend had a layer of yellow mud with stones, which gave way under the pressure of the feet. We felt thankful when we had got over this dangerous spot.

A few steps in advance the ground was deeply cut by a ravine, the stream of which ran into the main river at our feet. The mountain here formed a nearly perpendicular wall, which put a bar to our progress. There was no remedy but to slide down to the shore as well as we could, by the help of ropes, and to lay hold of the roots of small plants that grew out of the crevices of the rocks, suffering from falls and scratches.

We continued by the river-side, crossing the stream, but soon saw that we had got from bad to worse. In a few furlongs there was another precipice, at the base of which ran the river with a powerful current. Worn out and disheartened by this day's painful march, the sight of this new obstacle would have induced us to remain had there been space to lay ourselves down. My companions had not the strength or courage to prepare ladders so as to get over the cliff: perceiving, however, that at a short distance in advance the rivershore was satisfactory, we determined to pass the barrier in some way or other, by clinging to the angles of rocks and bushes that grew in crevices.

It was a strange spectacle, the five weary travellers, loaded with provisions and crawling along the face of a nearly vertical rock, holding on by feet and hands to the smallest object of support. The turbulent river ran below, ready to engulf the unfortunate one, should the fragile support give way. For my own part, perceiving above me many bushes and small trees, I managed to gain them; and then, performing a true arctural journey, I passed, but not without difficulty, from branch to branch monkey-like, and in the end got to the level rivershore.

We continued our journey for about a quarter of a league to a favourable spot, where we rested for the night, having made only two leagues this day.

This day there were fewer obstacles following the shores of the river, sometimes in the forest which was nearly level, and skirting mountains in a direction N.E., N., and S.W.

After making a few furlongs we saw the river Azulmayo, which enters the San Gavan from the ether, or left side.

After the confluence of the Azulmayo with the San Gavan, the mountains decrease in size, and then follows a chain of headlands of little elevation.

The river San Gavan, which before the junction of the Azul-mayo trended towards the north, now flowed S.E.

After a little more than half a league we arrived at the shores of a rapid river called by the *Cascanilleros* San Trilon, which gave us some trouble to ford. Once on the other side, our course was towards the east.

At the point of confluence of the two rivers, that of San Gavan runs east and west, that of San Trilon south-east and North-west.

A little further onward our march was N. and N.E. by the shore of the river. In advance we crossed a small arm of the San Gavan so as to continue our route on an island, after which we returned to the shore of the river. Here the great river flows through a narrow pass of naked rock, but of the same elevation on either side; a bridge could be easily constructed here—the width of the river is some 40 yards.

Continuing our route through the forest for some furlongs, we saw in advance a gleam of light through the foliage, and very soon afterwards came suddenly on an open space where we saw before us a spacious horizon. We had come unexpectedly on a broad quiet lake, and at our feet flowed the great river Inambari. A feeling of contentment was experienced by all at finding ourselves so unexpectedly on the banks of this river, which had cost us so much trouble and privation to arrive at.

The river San Gavan at the point of confluence runs from S.W. to S.E., and the Inambari from S.E. to S.W. In the angle formed by the two rivers the rock is of slate, which is the dominant formation in the province of Carabaya, but at this point the strata are nearly horizontal.

The water of the river Inambari is muddier than that of the San Gavan, and at the junction the Inambari is more than 200 yards in width. The velocity of the current for some distance above the confluence, at the time I visited it, was two leagues an hour.* At the point of junction the rivers are 1500 feet above the level of the sea.

Although the Inambari at this point is not easily navigable on account of its strong current, nevertheless grave difficulties do not present themselves except a little lower down, when large waves are produced by the meeting of the two currents. Navigation might be established for vessels of light draught.

It is to be presumed that the Inambari, until it unites with the river *Malvado Dios* of the forests of Uzuva, runs to the

* It is necessary to notice that here the velocity of the current is owing to the rapids, so that in the middle of the falls, and the flats, in which the rivers have little water, the current is less than at other portions of the journey.

neither a sharp incline; because, at a short distance from the confluence of the rivers San Geron and Inambari, the mountains become lower, until they nearly disappear farther in the interior. The elevation of the same point above the level of the sea, as before stated, being 1570 feet, and that of the Madre de Dios, according to the observations of Lieutenant Gibbon of the United States Navy, made in 1851,* at the point of junction with the Pini m., being 1377 feet, there results a difference of 193 feet for distance, which, according to my calculations—bearing in mind the numerous bends described by these rivers in their course—cannot be less than 25 to 30 leagues, equivalent to a fall of 8 feet per league, supposing that the Inambari joins the Madre de Dios at a little distance from the point measured by Lieutenant Gibbon.

All authors, up to the present time, who have written on the Inambari and Madre de Dios, have believed that these rivers form the head waters of the Purus; but it is now beyond doubt that the river Madre de Dios, united with the Inambari, takes the combined waters into the river Madeira. The solution of this important hydrographical problem we owe to the unfortunate Don Faustino Maldonado, of Tarapoto, in Peru, who sacrificed his life in the hazardous navigation of the Madre de Dios. This fact being probably unknown in Europe, I will give a short account of Maldonado's voyage, as it is connected with the subject of this memoir.

On the 5th February, 1861, Maldonado, with seven companions, after having constructed a raft, skunked themselves, with little or no provisions, to the current of the Madre de Dios, embarking at the confluence of the rivers Pini m. and Tono. On the 5th March, after having passed the mouths of many rivers which enter on both sides, principally from the right, they came to a place where the river had a most impetuous current; this obliged them to disembark and go a distance overland, building afterwards another raft to continue the voyage. On the 8th they again embarked, and at a short distance were surprised to find themselves in the river Mamore, of Bolivia, entering it from the right at a point inhabited by the *Chunchos*, or *Savage Carapapas*. On the 18th they were wrecked at a dangerous rapid, which appears to have been the spot known as *Calderao de Latorno*, or *Donvil's Calderon*, where Maldonado, with three of his companions, lost their lives. The remaining four continued the navigation, and, passing by the villages of Crato and the town of Barba, passed from the mouth

* *Exposition of the Valley of the Amazon*, Part II. By Lieut. Lordet Gibbon. Washington, 1854.

of the Madeira into the Amazons. In the city of Manaus or Iarna, of the Rio Negro, they obtained a certificate from the Brazilian authorities; they then ascended the Amazons and the Huallaga, returning to their native place Tarapoto.

In the beginning of 1842 the four companions of the unfortunate Maldonado again ascended the Ucayali and reached Chuzo, where they exhibited these certificates concerning their dangerous voyage.

Neither Maldonado nor his companions knew the names of the rivers they passed; and as, according to Gibbon's account of his exploration of the Madeira, in the region inhabited by the Caripunas no great river enters except the Beni, I believe that Maldonado's party entered the Madeira by this river. It results, therefore, that the Madre de Dios, after uniting with the Inambari, joins the Beni, which afterwards combines with the Manuré to form the Madeira. What confirms me the more in this opinion is that the account of Maldonado's voyage is in conformity with the particulars of the exploration from the mouth of the Beni, made, not many years since, by a Señor Palacios, by order of the Bolivian Government, which made known that the river Beni, at a little distance from its junction, had one fall—the same that was found by Maldonado on the 5th, when he was obliged to go overland for some distance.

On the other hand, the entry of the river Madre de Dios into the Madeira agrees with the important results of the recent exploration of the Purus made by Mr. Chandless, who has proved that the origin of the Purus is not the Madre de Dios.

Having proved that the Ollachen, or San Gavan, united directly with the Inambari before joining the river Marcapata, as stated by M. Marczy, in his '*Scenes des Andes*, I was now desirous of following the river upwards by the shores of the Inambari as far as the junction of the Esquilaya, which, as I have before stated, is the river that passes by Ayupata; I then intended to return to that town, following the ravine through which this river flows.

Now that I had been fortunate enough not to meet with any of the Chunchos Indians, I allowed my followers to have a day's rest, whilst I made the observations I have above recorded, and collected some plants and animals in the neighbouring woods.

Near the Inambari chincona-trees are not observed; they do not grow in so hot a region. The only representative is the *Cascarilla magnifolia*, Wold., which is able to withstand the range from temperate to hot; for this plant, called in Carabaya

Huámpo, is also found near the confluence of the river San Gaván.

The *Araceæ* are very common. There are numerous species of *Philodendron*, *Aranis*, and *Caladium*; that strange plant the *Monstera adansonii*, with perforated leaves; *Syngetum aviculatum*, Schott, m. *Dyfielochus reginae*, Schott. Several beautiful species of *Maranta* were also seen, among them the *Maranta leucata*, *alba*, and *rosea*; various *Cissus*, *Cyclanthus*, *Coriudocicus*; magnificent *Melastomas*, belonging to the genera *Isoetes* and *Ithetes*; finally, an infinity of *Bauhinias*, *Angura*, *Pecillas*, *Paulownia*, *Mikania*, &c.

Among the mammiferous animals, the common species are the tapir, porcuŕy, porcupine, and *Hydrochatus capybara*. Of birds, I will only mention the more usual, as several species of *Circus* and *Pernelo*, which yielded us good eating.

On the 12th we were again on the march, skirting, as well as we were able, the river Huámpo in a direction varying from S.E. to S.S.E. We soon passed a great stream, after which we entered the forest; at a quarter of a league we found ourselves on a sandy beach, where many palms, of the genus *Trinitis*, grew. We then varied our course to S.S.W. and S., and to S.E.

In another quarter of a league, after having passed two streams, we traveled east and north-east, and at a short distance observed a river entering the Huámpo from the opposite side, to which my followers gave the name of Chunchomayo; for they thought they had seen some *Chunchos*, or savages, on its banks. We now passed some small streams, and, going through some forest in a S.S.E. and east direction, we reached a river having very little water, to which was given the name of Rio Blanco: this we crossed and descended to a beach, where we passed the night.

On the 13th we moved in a S.S.E. direction over very broken country and through thick woods for half a league, then descending to the bank of the river we progressed by a track which was nearly dry, excepting during freshets. That spot is much frequented by tapirs. Not far off was a small river, which entered the Huámpo by the other side. The ground was a little more even, with luxuriant vegetation; among the plants still rare in Europe was the beautiful *Calceolaria Fitchiana*, Hook, which I had first seen on the banks of the Huámpo.

Passing a rivulet, and then, at a quarter of a league's distance, another, we arrived on the banks of a river divided into various arms, which my men called Caŕari; this we forded at no small risk, for the current was strong. Nearly in front of

the mouth of the Charari, on the opposite side, another river comes in direct from the north.

Continuing our march in a general direction of N.S.W. and S.W., at half a league's distance from the river Charari a stream was found; and in another half league we crossed a narrow and dark ravine watered by a small stream, which my men named the River Calaboza. On the track several beautiful birds were seen, including *Cephalopterus ornatus*, with its elegant parrot of feathers over its head; the *Prionites monota* the *Procnia ventralis*, &c. In front of the little river Calaboza another small stream enters the Inambari from the opposite side.

Continuing our march, at a short distance from the Inambari, our direction was changed towards north-west and south-east, and we traveled nearly a league over land full of shrubs and tangled plants, making our march painful.

As it threatened rain, we halted early, so as to have time to protect ourselves from the downfall. The night turned out miserably wet.

On the 14th we did not start till late, and, after going half a league, we had the pleasure of finding ourselves at the River Esquilaya, which flows by the town of Ayapata. We knew it at once, for we were satisfied there was no other between it and San Gavan which could have so large a quantity of water. This spot was 1833 feet above the level of the sea.

At the point of junction of the two rivers, the Inambari comes from south-east, and its waters are muddy; the Esquilaya comes from south, and its waters are transparent. As these two rivers meet at an acute angle, their waters run side by side for a good distance without mixing, forming two bands of distinct colours. At the point where they join, there is an extensive sandy beach, which during the freshets, is doubtlessly covered with water.

Here we left the shores of the Inambari, to enter the ravine of Esquilaya, travelling along its left bank, first in a S.W. direction, and afterwards S. and S.E. We soon had to take to the woods, and open a track over very rough country; it became late, and we were obliged to halt on a small sandy beach of the River Esquilaya, after having progressed only one league from the junction of the Esquilaya and Inambari.

On the 15th we left the beach where we had slept, and entered the forest not being able to march by the river-side; but we had not walked a league when serious obstacles presented themselves. Slides-rocks arose on all sides, and the mountains continued so precipitous that it was almost impossible to open a

route. At this point the River Esquilaya runs in a narrow opening of rock, scarcely 25 yards wide.

We had now to consider what was to be done. If we continued on this side for a short distance, we calculated we should come upon the river Quillabamba, the head-waters of which, being on the heights of the road of Ayapata and San Clavus, receives so great a number of streams in its long course, that, when it enters the Esquilaya, it has too great a volume of water to be fordable. On the doubt, therefore, of finding a ford, we did not continue this route. Some of the men were certain that at a short distance, on the other side of the River Esquilaya, we ought to come upon a small corn-plantation, belonging to the Indians of Ayapata; so we decided, to throw a bridge across the river, and continue our march on the other side. We were on the steep slope of a hill, and some 50 yards above the river; so we decided to cut down a tree of sufficient length to reach, when it fell, to the other side of the river. We soon found a tree to suit our purpose; the axe went to work on one side of it, it began to creak, and soon fell with a great noise, taking with it several smaller trees: unfortunately, however, instead of falling across the river, it fell obliquely, and the upper part not reaching to the other side, it was carried away by the stream. We sought at once for another tree, and, having taken better precautions, in an hour the last cut of the axe caused the tree to bend over and fall right across the river, at 100 feet above it. We had now the means of communication with the other side. Still we had some difficulties in crossing our slippery and uneven bridge; but we succeeded at last in getting across, and continued our journey.

I had never in the course of my wanderings experienced so rough and painful a route. The slopes of the mountains we were on were so steep that we had the greatest difficulty to keep ourselves from falling headlong into the river. It was necessary to hold, at every step, by the small trees that grew out of the crevices of the rocks; and, to our sorrow, the trees were partially rotten and broke away from our grasp, causing us to make a false step. The spurs and thorns of the bushes tore our hands, and caused them to be covered with blood.

This, indeed, was a day of trouble and incessant labour, and when night came we had no better prospect than to sleep on the banks of a stream which fell over the bare rock. In the hope of finding a better spot, we continued our march, until night came upon us, without our having met with a level space sufficiently large to spread our beds upon; we had finally to sleep almost on the branches of trees, in continual danger of rolling down the slope into the river.

On the 16th, after having passed a most unpleasant night, we ascended a slope in a southerly direction for some furlongs. We then continued skirting the mountains to s.w. and s.w., until we came suddenly upon some pine-plants and coca-bushes. One of my men told me that this was the last cultivated spot in the quebrada of Esquilaya towards Inambari, and was called Huallasa.

When we started from San José, we carried provisions for fifteen days; but my Indians, to lighten their loads, had consumed more than the allotted quantity, so that even before ten days had passed our provisions were nearly at an end. Indians, when they accompany travellers on such expeditions, do not go with a very good will, and adopt all methods to secure a return to their homes as quick as possible; for this object, as they are pretty sure that they will not perish of hunger themselves if they have a little coca and chicha, they bring the traveller to a standstill by consuming his provisions, thus obliging him to return, saying that they cannot go on without food. The Indians who accompanied me did not speculate on returning by the quebrada of Esquilaya, and had eaten up the greater portion of the provisions before we got to the Inambari, so, and partly on account of suffering from the great fatigue of the exploration, we had hunger staring us in the face.

In Huallasa there were no inhabitants. The owner of the place was an Indian of Ayapata, who only came occasionally to collect his little harvest of coca, for the locality was frequently visited by savage Indians, or Chunchos as they are called.

We descended a quarter of a league towards the s.w. to a level tract covered with wood; then marching s.w. some furlongs, we arrived at a river called Negronayo, which had a good supply of water. We forded this, and traveled south a short distance, on our way to another river called La Comandada. Fording La Comandada, we continued our route through the forest, and, after half a league's march, came to another cross-plantation, near which was an abandoned hut. This place was known as Huerta Pampa, belonging to an Indian of Ayapata.

In front of Huerta Pampa is seen the river Quilabamba, which joins the Esquilaya; but it has a little less water than the latter.

By an anomalous territorial division, the lands situated on the other side of the Esquilaya, and near to the Quilabamba, belong to the inhabitants of Itata, a place much more distant than Ayapata.

As we found no provisions in Huerta Pampa, we continued our route a few furlongs, and reached another cultivated place called La Hacienda, where we put up for the night.

Here we found only a few coca plants and banana-trees,

without fruit; there were a few pineapples and other fruit, all ripe. The habitation here was in a miserable and abandoned state. We were now in a state of starvation.

Leaving this spot, our course was southerly along a slight incline, with a fair route. At a quarter of a league we passed a stream called Lucumayo, and continued on the other side towards the s.s.w. for a few furlongs, so as to arrive at a small cove, where we had the good fortune to fall in with some ripe bananas. My men, who had been fasting for two days and were almost exhausted, fell foul of the beautiful bunches of golden fruits, and were soon strong enough to resume the march.

We continued in a southward direction, passing a stream, and after walking a quarter of a league, fell in with another cove and a habitation. This place was named Pusara, and nearly in its front was the River P'yapallani. Continuing our march to the s.s.e., we came to the River Tunpajunyo, so called because in its vicinity a rounded the beautiful bark of an orange colour, known to the Indians as the Tunpi (*Aspicula peruviana*). We crossed this stream by a bridge formed of three boughs, and afterwards two others, descending a little afterwards, and arriving at the bridge over the Esquilaya.

The bridge of Esquilaya, being the work of Indians, deserves a brief notice. The river is here some 10 yards in width, and as there are no trees in the neighbourhood long enough to span it, the Indians have had recourse to a contrivance not wanting in originality. They have excavated on either side three deep oblique holes and inserted in them solid trunks of trees, which by the slanting position of the holes have an inclined position, so that the interval between the two sides of the river is considerably diminished. Three horizontal boughs have been laid on the extremities of these trunks, and upon this structure are bound other sticks transversely, like a ladder, but nearer to each other. These sticks are annually renewed, but the large pieces of trees used in the framework being more durable, have remained the same for about twenty years. The bridge of Esquilaya is 2298 feet above the level of the sea.

Crossing the bridge we ascended by a zigzag track in a direction to s.s.w. We crossed a large stream, called Churumayo, and continued ascending to the tambo of Esquilaya, distant from the bridge half a league. This tambo, or travellers' shed, takes the name of Esquilaya because the bridge is considered the door of entry to the hot valleys below, where the coca is cultivated, and it is consequently the point of rendezvous for the Indians, who have their little plantations in the Esquilaya valley, and is much frequented at harvest time. At this tambo lives an

Alcalde, attended by another Indian, who acts as Alguazil, and carries out his orders. It is always an Indian who fills this post; but he does not understand one word of Spanish—his language being Quichua.

The tambo of Esquilaya is the only inhabited spot in the whole valley, and the other places being peopled only during the coca harvest, the people during the rest of the year all live in the town of Ayapata. The Indian owners of these small *ceccales*, when they return for the season to Ayapata, leave their provisions, sheepskins used as bedding, cooking-pots, working clothes, &c., tied up in bundles, to the Alcalde, who takes care of the property, hung to the thatch of his house, until the following year. It is not unusual to see more than a hundred of these bundles, each hanging by a cord from the rafters of the thatch; and it is curious that the Indians should, after many months, each know his own bundle, as they are all so much alike.

It is only a few years since that the Indians used to leave their working instruments, consisting of cutlasses, called *velunas* and lathets; but since 1850 they have ceased to do so, for on the 4th of May of that year the savage Indians came as far as the tambo of Esquilaya, killed the Alcalde, and took away 800 cutlasses and 300 hoes. It is not the first time that the Chunchos have attacked Esquilaya. When the bridge was being constructed they killed by arrows an Indian who was boring the rock.

The Chunchos are continually prowling about the valley, and lose no opportunity of being troublesome. My followers looked upon themselves as most fortunate in having made so considerable a journey in the Chuncho country without having fallen in with a party of them.

The principal cultivation in the valley of Esquilaya consists of coca and maize; still some little coffee, together with bananas, papaw-trees (*Carica papaya*, Lam.), yuca—*Philum pyrifera*, Lam.), and yuca *Maniotapi*, Pohl.) are planted.

The tambo of Esquilaya lies 4300 feet above the level of the sea, so that its climate is rather temperate, as will be seen by the table in the Appendix.

There is a road between the tambo of Esquilaya and the town of Ayapata, a distance of 11 leagues. We left on the 23th. The path does not lie along the ravine, on account of its being so closed in by rocks. Leaving the tambo there is a continuous ascent in a s.s.w. direction for nearly a league; then the course is s. and s.s.w. At a league and a half distance is the tambo of Chillea; the road henceforward lies along a ridge which divides the River Ayapata from the Venco, the same stream which lower down is called the Quillabamba.

A league and a quarter above Challeja is the small tambo of Chircun. As we ascended the latter, trees diminished in number and the vegetation became more uniform; half a league higher up, the greater portion of the trees belong to the genus *Clusia*, known in Carabaya as the Huitaro. On this road I noticed a new and small species of *Chinchona*, the flowers a red varnish, with much white down on the borders of the corolla. This species has some analogy with *Chinchona coccinea*, *erythrantha*, and *obovata* of Pavon.

Some four leagues from Esquilaya we came to the tambo of Ychuzalla, where we passed the night. This spot is 10,000 feet above the level of the sea; nevertheless in its vicinity are seen several *clusia*-trees.

On the 21st we continued our march towards Ayapata, ascending towards the south for more than half a league, and then to the south-west for another quarter of a league to the tambo of Sachapata, which has two habitations.

The tambos between Esquilaya and Ayapata are visited by the Indians only when they go to and from the coca-plantations situated in the valleys of Esquilaya, Puypullani, and Quillabamba.

A few paces from Sachapata there is a small lake. The road is undulating until the most elevated portion of the road is attained, called the Apachetas of Compacosi, situated at 12,811 feet above the level of the sea.

Skirting the mountains we passed two other points of similar elevation—the Apachetas of Chuncha and Chulenco. From the last we descended to the quebrada of Ayapata, but without reaching to the river; and we continued skirting this ravine a quarter of a league before we arrived at the town. We passed the River Yungunayo and then ascended to Ayapata, after a journey of fourteen days, in which we had undergone all sorts of difficulties and privations. We have, however, the satisfaction of having accomplished something towards elucidating the geography of this little-known region. We had proved that the rivers Ollachea and Ayapata enter directly into the River Inambari, without previously forming a junction with each other, or with the Marcapata of the forests of Cuzco, as it is erroneously laid down in many maps.

APPENDIX.

METEOROLOGICAL TABLE.

The wet-bulb observations were made with the thermometer covered by a thin cloth and kept wet. The barometric observations are corrected by temperature and the state of the weather.*

AT CRUCKERO, Capital of the Province of CAHUVAYA

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
1861.		Fahr. °	Fahr. °	Inches.		
August 15	2-15 P.M.	51-62	39-56	18 353	Light large clouds ..	12°-30 F.
16	6 30 A.M.	23 30	32-0	18 465	Sun	
September 30	9 A.M.	45 86	42-44	18 394	Sun obscured.	
"	11 A.M.	49 48	42 44	18 380	Cloudy.	
"	1 30 P.M.	49 82	41-80	18 296	Sun.	
"	3 P.M.	50 90	41-36	18 295	Ditto .. .	27°-32 F.
October 1	9 A.M.	44-60	39 02	18 312	Ditto .. .	
"	9 A.M.	47-48	41-28	18 448	Ditto	
"	12 noon	50-21	41-36	18 388	Sun obscured.	25° F.
2	9 A.M.	42 10	43 70	18 407	Sun .. .	
"	9 30 A.M.	49 10	41 36	18 000	Sun obscured.	
"	10 30 A.M.	49 46	41-36	18 398	Cloudy	
"	12 noon	51-80	41 54	18 378	Sun obscured.	
"	1 30 P.M.	53-36	42 62	18 445	Sun.	
"	3 P.M.	50-54	41-54	18 354	Cloudy .. .	26°-24 F.
3	9 A.M.	47-64	41-0	18 454	Ditto .. .	
"	10 A.M.	51-58	41-54	18 455	Sun much ob- scured.	
"	11 30 A.M.	51 44	41-90	18 493	Ditto	
"	1 P.M.	51-44	42 26	18 392	Ditto.	
"	2 P.M.	50 76	42 26	18 378	Sun variable.	
"	3 P.M.	51 8	41 54	18 349	Cloudy	
4	9 A.M.	46-53	39-20	18 454	Sun obscured	20°-30 F
"	10 A.M.	47-48	39-56	18 437	Ditto	
"	11 A.M.	51-26	41 10	18 476	Sun.	
"	12 noon	53 42	38 30	18 380	Ditto	
"	1 P.M.	53 26	38 43	18 339	Ditto	
"	1 20 P.M.	55-54	38 48	18 326	Ditto.	
"	2 P.M.	54-46	38-56	18 307	Ditto.	
"	3 P.M.	51 24	39-95	18 277	Ditto	
"	6 30 P.M.	38 12	54 52	18 380	Clear .. .	19°-22 F
29	9 A.M.	31-28	29-30	18 446	Cloudy .. .	

* The observations were made by a thermometer graduated to centigrades, and a barometer in millimetres, the results have been reduced to degrees of Fahrenheit and English inches by means of Gayot's tables.—Ed.

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CRUCERO—continued.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
1866.		Fahr °	Fahr °	Inches.		
October 29	10 A.M.	33.81	29.30	18.470	Cloudy	
"	11 A.M.	38.51	32.2	18.461	Ditto	
"	12 noon	42.08	37.40	18.440	Ditto.	
"	1 P.M.	47.84	38.84	18.427	Sun much obscured.	
"	2 P.M.	46.43	39.20	18.386	Ditto.	
"	3 P.M.	45.76	40.10	18.376	Ditto.	
"	4 P.M.	49.13	41.0	18.328	Sun.	
"	5 P.M.	49.10	41.0	18.360	Ditto.	
"	6 P.M.	45.50	41.0	18.337	Clear	
"	7 P.M.	44.78	41.1	18.364	Ditto	

TOWN OF MACUSANI

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
		Fahr °	Fahr °	Inches.		
August 17	2 45 P.M.	55.76	43.16	17.958	Sun	18° 50
"	3 30 P.M.	52.52	42.62	17.934	Ditto	
"	4 30 P.M.	50.51	41.36	17.935	Ditto	
"	5 A.M.	36.50	33.14	18.032	Ditto	
"	9 A.M.	47.84	40.64	18.035	Ditto	
"	10 30 A.M.	40.10	40.82	17.992	Scattered cumuli.	
"	12 noon	51.44	41.76	17.971	Sun	
"	1 P.M.	50.72	41.64	17.942	Sun obscured.	
"	2 P.M.	51.90	40.82	17.914	Cloudy	
"	3 P.M.	50.72	41.64	17.932	Sun obscured.	
"	4 P.M.	47.66	39.50	17.925	Sun.	
"	5 30 P.M.	49.08	36.50	17.952	Cloudy.	
"	6 30 P.M.	40.10	35.24	17.974	Ditto.	
"	10 30 P.M.	32.0	29.84	17.986	Moon; clear	
"	11 30 P.M.	27.50	29.84	17.979	Ditto do.	
19	7 30 P.M.	25.38	22.48	17.916	Sun obscured	19° 40

TOWN OF AYAPATA.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
		Fahr °	Fahr °	Inches.		
August 27	2 30 P.M.	46.76	46.04	19.876	Rain.	
"	3 P.M.	46.04	45.5	19.854	Ditto.	
"	4 P.M.	45.68	44.50	19.832	Cloudy.	
"	6 P.M.	45.70	43.52	19.857	Ditto.	
28	8 A.M.	41.54	40.82	19.909	Ditto.	

TOWN OF AYAPATA—continued.

Day of Month.	Hour.	Therm. measured in Air.	Wet Therm. measured.	Barometer.	State of the Heavens.	Maximum Temperature of Day.
1894.		Fahr.	Fahr.	Inches.		
August 28	10 A.M.	48.28	45.86	19.907	Sun.	
..	12 noon	48.56	46.04	19.882	Sun. scattered clouds.	
..	2.30 P.M.	47.48	45.68	19.828	Cloudy.	
29	9 A.M.	41.38	40.14	19.874	Much cumulus, variable.	
September 22	5.40 P.M.	42.08	41.76	19.886	Cloudy.	
..	6 P.M.	42.26	41.72	19.896	Ditto.	
..	7 P.M.	45.86	43.57	19.895	Serene.	
..	8 P.M.	44.06	42.28	19.900	Ditto.	
..	9 P.M.	44.21	42.26	19.907	Sun. scattered clouds.	
..	11 P.M.	44.40	42.25	19.908	Ditto.	
..	12 noon	43.52	42.34	19.908	Serene.	
23	8 A.M.	47.84	44.47	19.915	Cloudy; sun partly covered.	
..	9 A.M.	45.10	44.76	19.866	Sun. covered.	
..	12 noon	49.10	48.72	19.835	Cloudy.	
..	1 P.M.	46.40	47.50	19.874	Sun.	
..	2 P.M.	46.40	45.08	19.854	Ditto.	
..	3 P.M.	47.12	46.76	19.853	Cloudy.	
..	5 P.M.	45.50	45.50	19.868	Rain.	
..	7 P.M.	45.50	45.42	19.903	Cumulus scat- tered.	
..	11 P.M.	44.24	44.06	19.963	Ditto.	
24	5 A.M.	46.40	45.52	19.942	Ditto.	
..	9 A.M.	48.02	44.78	19.946	Sun. clouded.	
..	11 A.M.	50.54	46.78	19.917	Sun.	

ULLACHES.

Day of Month.	Hour.	Therm. measured in Air.	Wet Therm. measured.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
August 26	6.40 P.M.	52.52	44.78	21.717	Cloudy.	
27	7.20 A.M.	49.64	46.74	21.806	Sun.	41.72 F.
28	8.20 P.M.	50.38	46.36	21.780	Cloudy.	
..	4.40 P.M.	49.04	48.32	21.776	Ditto.	41.70 F.
27	7 A.M.	46.40	44.78	21.863	Serene.	

Continued, 25th Aug 94, 7.35 A.M.

Thermometer in air	35.24
Wet	35.24
Barometer at 12 .. .	16.438
Variable weather.	

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TAMBO DE LATANARA, 1st September, 7 30 A.M.

Thermometer free in air	54° 14
"	wet	53° 30
Barometer	..	..	..	..	..	28° 333
Variable.						

TAMBO DE PACANARI, 2nd September, 9 30 A.M.

Thermometer in air	..	..	..	..	..	64° 60
"	wet	..	..	..	..	62° 36
Barometer	..	..	..	..	..	27° 380
Sun.						

METEOROLOGICAL OBSERVATIONS made at the Hacienda of S. JOSE DE BELLA-VISTA, in the Valley of SAN GAVAN

Day of Month.	Hour	Thermometer in Air	Wet Bulb Thermometer.	Barometer	State of the Heavens.	Minimum Temperature at Night
1841		Fahr.	Fahr.	Inches.		
September 2	2-30 P.M.	74° 12	73° 04	27° 510	Sun	65° 48
..	3-30 P.M.	72° 50	69° 52	27° 533	Cloudy	
..	6-30 A.M.	64° 04	64° 04	27° 576	Ditto	
..	7-30 A.M.	65° 12	65° 12	27° 593	Ditto	
..	8 A.M.	66° 50	65° 49	27° 599	Sun, and scattered clouds.	64° 04
..	9 A.M.	70° 16	69° 08	27° 616	Sun	
..	9-30 A.M.	70° 04	69° 44	27° 628	Ditto	
..	10-30 A.M.	71° 52	71° 60	27° 617	Ditto	
..	11-30 A.M.	71° 34	71° 60	27° 579	Ditto	64° 40
..	12 noon	71° 78	71° 56	27° 592	Ditto	
..	1 P.M.	70° 50	72° 52	27° 575	Much cumulus.	
..	2 P.M.	70° 41	71° 60	27° 560	Clouded.	
..	3 P.M.	70° 16	71° 60	27° 577	Ditto	64° 76
..	4 P.M.	71° 72	71° 60	27° 539	Sun; much cumulus.	
..	5 P.M.	75° 56	74° 06	27° 546	Clouded.	
..	6 P.M.	74° 81	73° 04	27° 542	Ditto.	
..	7-11 P.M.	72° 39	71° 60	27° 544	Sun & scattered	64° 76
..	8 A.M.	70° 16	68° 72	27° 615	Sun in a obs. cloud	
..	9 A.M.	73° 04	69° 26	27° 632	Ditto.	
..	10 A.M.	70° 64	72° 64	27° 616	Clouded.	
..	11 A.M.	71° 72	71° 20	27° 597	Ditto.	64° 40
..	12 noon	70° 76	71° 18	27° 568	Ditto.	
..	1 P.M.	74° 12	71° 78	27° 569	Cloud threatens	
..	4 P.M.	76° 52	74° 06	27° 547	Slight rain	
..	5 11 A.M.	80° 11	75° 40	27° 576	Clouded.	64° 76
..	12 noon	81° 14	75° 20	27° 563	Sun.	
..	1-15 P.M.	74° 46	69° 80	27° 552	Tempest threatens; sky grey, thunder.	
..	2-30 P.M.	72° 50	70° 52	27° 517	Clouded, rain.	
..	4 P.M.	72° 32	70° 16	27° 517	Rain	64° 76
..	7 P.M.	70° 76	69° 08	27° 514	Clouded	
..	11 A.M.	74° 48	71° 78	27° 577	Ditto.	
..	4 P.M.	74° 56	75° 50	27° 467	Ditto.	
..	5 P.M.	75° 02	71° 60	27° 471	Sun.	

During the night from the 4th to the 5th it rained continually, and nearly up to daybreak.

RAIMONDI on the River San Gavan

September 8, PLATA ON SHORE OF THE RIVER SAN GAVAN, 6 A.M.

Thermometer in air 60° 50
 " damp 59° 14
 Barometer 27.990
 Cloudy weather.

September 9, SHORES OF THE RIVER SAN GAVAN, 6:30 A.M.

Thermometer in air 61° 70
 " wet 60° 44
 Barometer 28° 152
 Cloudy weather.

September 10, SHORES OF THE RIVER SAN GAVAN, 9 A.M.

Thermometer in air 63° 84
 " wet 64° 40
 Barometer 28° 327
 Sun obscured.

THE following METEOROLOGICAL OBSERVATIONS were made at the junction of
 the SAN GAVAN with the INAMBARI.

Day of Month.	Hour.	Thermometer in Air	Wet Thermometer	Barometer.	State of the Sky.	Minimum Temperature at 5 p.m.
1862.		Fahr.	Fahr.	Inches.		
September 11	11 A.M.	79 16	69 62	28.497	Sun.	
	12 noon	78 80		28.466	Ditto.	
	1 P.M.	78 44	70 16	28.418	Sun and cloudy	
	2 P.M.	78 80	69 28	28.378	Ditto.	
	3 P.M.	79 16	65 36	28.347	Ditto.	
	4 P.M.	77 72	71 0	28.343	Ditto.	
	5 P.M.	73 76	69 80	28.347	Ditto.	
	6 P.M.	71 78	67 64	28.390	Ditto	
	7 P.M.	68 0	66 62	28.390	Clear	60° 44 F
	8 P.M.	66 20	65 24	28.418	Ditto.	
	5:45 A.M.	60 80	60 80	28.414	Mist, rather dense.	
	6:30 A.M.	60 80	61 16	28.439	Sun; mist clearing off.	
	7:30 A.M.	64 40	65 12	28.437	Sun.	
	8 A.M.	71 24	66 36	28.465	Ditto.	

SHORES OF THE INAMBARI, 12th September, 8 A.M.

Thermometer in air 64° 74
 " wet 63° 58
 Barometer 28° 347

SHORES OF THE INAMBARI, 13th September, 4:30 P.M.

Thermometer in air 70° 16
 " wet 67° 04
 Barometer 28° 170
 Threatening rain.

14th, 10:30 A.M.

Thermometer in air 65° 48
 " wet 65° 12
 Barometer 28° 220
 Cloudy.

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BEACH ON THE RIVER ESQUILAYA, 15th September, 6.45 A.M.

Thermometer in air	62.60
Wet	..	..	..	..	..	..	61.16
Barometer	..	..	..	..	..	..	28.032
Sun shining.							

LA HACIENDA, 17th September, 7 A.M.

Thermometer in air	..	..	..	..	..	..	63.50
Wet	..	..	..	..	..	..	62.60
Barometer	..	..	..	..	..	..	27.520

METEOROLOGICAL OBSERVATIONS made at the Tambo of Esquilaya.

Day of Month.	Hour.	Ther- mometer in Air.	Wet Ther- mometer.	Barometer	State of the Heavens.	Minimum Temperature at Night.
1884.		Fahr.	Fahr.	Inches.		
September 18	7 A.M.	64.76	64.40	25.886	Rain.	
"	8 A.M.	64.40	64.60	25.888	Cloudy.	
"	9 A.M.	66.20	64.58	25.890	Ditto.	
"	10 A.M.	69.62	67.82	25.900	Ditto.	
"	11 A.M.	70.34	68.66	25.877	Ditto.	
"	12 noon	71.96	69.44	25.899	Sun.	
"	1 P.M.	73.58	68.36	25.884	Ditto.	
"	2 P.M.	74.12	68.84	25.768	Ditto.	
"	3 P.M.	72.86	68.09	25.792	(Sun much covered.)	
"	4 P.M.	72.88	68.84	25.788	Ditto.	
"	5 P.M.	69.64	65.68	25.788	Sun sinking.	
"	6 P.M.	68.36	65.12	25.797	Clear.	
"	7 P.M.	67.28	65.30	25.781	Ditto.	
"	8 P.M.	62.10	64.60	25.783	Ditto.	
"	9 P.M.	60.23	64.04	25.824	Ditto.	
"	10 P.M.	66.29	64.56	25.873	Cloudy.	
"	7 A.M.	62.96	62.06	25.867	Rain.	61.16
"	8 A.M.	63.51	62.42	25.873	Ditto.	
"	9 A.M.	62.78	62.14	25.923	Ditto.	
"	10 A.M.	63.68	62.78	25.914	Ditto.	
"	11 A.M.	63.12	64.30	25.910	Rain ceases.	
"	12 noon	66.92	66.38	25.906	Sun shining.	
"	1 P.M.	64.22	63.68	25.848	Cloudy.	
"	2 P.M.	64.78	62.43	25.843	Rain.	
"	3 P.M.	62.96	62.14	25.809	Cloudy.	
"	4 P.M.	62.42	61.43	25.810	Ditto.	
"	5 P.M.	62.76	61.34	25.816	Ditto.	
"	6 P.M.	..	59.72	25.826	Ditto.	
20	7 P.M.	60.44	59.64	25.832	Ditto.	59.0
"	7 A.M.	61.48	61.88	25.848	Sun obscured.	
"	8 A.M.	61.34	63.50	25.856	Ditto.	
"	9 A.M.	65.84	64.22	25.852	Sun.	
"	10 A.M.	69.98	65.84	25.849	Ditto.	

VII. — *The Delta and Mouths of the Amu-Daria or Oxus.* By Admiral A. BOUTAKOFF, of the Russian Navy. Translated from the Russian, and communicated by JOHN Mc HELL, Esq., H.B.M. Vice-Consul at St. Petersburg.

East, March 11, 1847.

THE Amu-Daria, or Oxus of the ancients, after flowing in one main channel through the greater part of the Khanat of Khiva, first begins to bifurcate in about lat 42° 12' and long 60° 15' of Greenwich, between the towns of Kipchak and Khodja-li, after which it divides into the several branches which form its delta. The centre part of this portion of the basin forms a sort of depression, into which the waters of all the branches, excepting the westernmost, empty themselves, in a series of lakes, overgrown more or less with reeds; out of these they again flow off in separate channels, discharging themselves into the sea of Aral.

The Delta of the Amu-Daria lies between the two main branches of the river—the Laudan, which strikes off to the west, and the Kuvan-Djarma, or Kuk, which branches off somewhat below the town of Khodja-li on the east, the latter, above the point where it falls into the sea, is known by the name of "Yangy-su."

The course of the Laudan, as well as the middle portion of Aibagir Lake, which is overgrown with reeds, and through which the Laudan flows, have not as yet been explored. I examined the mouth of the Laudan in 1818-19, and in 1838, and found a depth of $1\frac{1}{2}$ to $1\frac{3}{4}$ feet, across the bar, with a very forcible current. The bottom on the bar was so firmly overgrown with reeds, that I saw a caravan of 1500 camels, proceeding to Russia, ford it with ease. In order to keep off and control the Yairud Turkmen, who roamed along the course of the Laudan and around Lake Aibagir, and who preyed on the inhabitants of the western borders of the Khanat, the Khivans dammed the upper portion of the Laudan, and erected the small fortress of Bent in its defence. The Turkmen, taking advantage of the frequent interruptions in Khiva, on several occasions destroyed the dam, which had been constructed with the object of depriving them of water, but the Khivans each time repaired it as well as they could. The Laudan is principally supplied with water from the overflowing of the Amu-Daria.

The eastern arm which limits the delta flows off to the right, as already stated, below the town of Khodja-li and is called the Kuvan-Djarma, or Kuk (Blue). It runs in a northerly and north-easterly direction, fills the lakes Dnu-kara and Tamyne-Ayaze, and then, under the name of Yangy-su falls into the Tush-bus bight of the Aral, opposite Ernudoff Island.



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The appellation of Yangy-Su, or Yangy-Daria (New Water or New River), pronounced by the Kirghiz "Djangy-Su" or "Djangy-Daria," has given rise to a general confusion of the Djangy-Daria—branching off from the Amu—with the Dju-Daria, which is tarown off by the Syr (or Jaxartes) below Fort Perovski, and loses itself in the sands; there being nothing in common between these two rivers.

In 1848 and 1849 the principal mass of the waters of the Amu-Daria was discharged through this branch into the sea, so that close to Ermo-off Island, 9 miles from the mouth of the Yangy-Su, we drew fresh water from over the side of the vessel. In 1846 the water in the whole of the Fuscé bas light, which had shallowed, was perfectly salt. The reason of this in all probability was, that during this decennial period the mass of water had found vent in another direction.

I ascended the Yangy-Su and its prelongation the Kuk in 1850 as far as Lake Jampyné-Ayag, which is situated opposite Lake Dai-Kara, and is separated from it by a narrow and depressed spit, over which at high-water flood the water reaches into the Dai-Kara. These lakes communicate with each other so by a small stream, about 20 fathoms broad. Before falling into the sea the Yangy-Su forms its own delta, and flows past several small billowy islets called "Bish-Kum." The breadth of the Yangy-Su is from 40 to 70 fathoms, with a depth of 3, 7, and 8 feet; its banks consist mostly of sandy billows, overgrown with the "saxaul," and on firmer ground by the "Dyda" (*Saxaria*), the berries of which are collected in the autumn by the Kirghizes and Karakalpaks. Cultivated fields and meadows occur occasionally by the riverside. The current of the river is very weak, about one-half and three-quarters of a knot per hour; it rarely attains $1\frac{1}{2}$ knot per hour.

After ascending the Yangy-Su, 224 miles, my farther progress was arrested by the Yangy-sanyng-tashé, a rocky ridge extending right across the bed, the depth of water over it was $1\frac{1}{2}$, 2, and $2\frac{1}{2}$ feet, and only in one place was there a narrow channel with 2½ feet; the rocks consisted of a grey sandstone. In consequence of this barrier I was compelled to leave behind me my principal vessel, a steamer of 40-horse-power, whose draught did not allow her to pass the ridge, and to continue the survey in an open 12-horse-power steamer, with a crew of eighteen men. The stony bottom, with sharp rocks here and there rising nearly to the surface of the water, extends for about 8 miles from the ridge. By constant soundings I found that, immediately after depths of 7, 8, and 9 feet, there were depths of 3 feet and less, and that the steamer raised the rocks, first on one side and then on the other, after which soundings of 7 and

8 feet were again obtained. The banks here on both sides rise to from 40 to 60 feet, steep, and consisting of clay, being covered with bushes, affording capital ambush. As we arrived here unexpectedly we met no one, but if the Choudur Turkmen located around the Khivan fortress of Kurganché, erected higher up on the Kuk, had been informed of our approach, three or four of them, stationed in the bushes, might easily have shot down the whole of my party without incurring any danger themselves. Above this point this branch is called the "Kuk" (blue), and flows between sandy hillocks overgrown with saxaul. In some places it washes round very low islands, and in others it throws off small lakes by its sides. Its breadth is from 50 to 80 fathoms, and depth, 5, 6, 7, and 8 feet. Beyond the reed-covered lake of Tampyné-Ayagé is Chutchka-las Mountain, on the eastern slope of which is situated the Khivan fortress of Kurganché, which dominates and keeps in subjection the Kughizes and Karakulpaks, who nomadize or are settled in those parts and around Lake Dan-Kara.

Lake Tampyné-Ayagé and the farther course of the Kuk were not surveyed by me, inasmuch as during my expedition, which was in September, the water had considerably subsided; besides it would have been the extreme of rashness on my part to have penetrated into the heart of a hostile country with eighteen men, having a Khivan fortress in my rear, and knowing, as I did, that the signal of alarm had been sounded throughout the whole country in consequence of my sudden appearance at Nukus Fort, the particulars of which will be given further on.

After throwing off the Kuvan-Djurma or Kuk, the Amu-Daria flows to the north-west and north; its waters, however, are continually drained into a number of small streams striking off to the right, and particularly into a bigger one, the Karabadi, which spreads out over the depressions, forming reed-covered lakes, out of which the water then runs off into the one common channel of the Ukun-Daria (Great River) the branch containing the largest amount of water of all the branches by which the Amu-Daria discharges itself into the Sea of Aral.

Only one part of the Amu—namely, that called the Taldyk, below the town of Kengrad, and which separates into several small streams before falling into the sea—reaches the Aral without having its course interrupted by lakes. The Taldyk, from the western side, is the second of the mouths of the Amu. In 1848 and 1849 it had a very rapid current, and a depth of 3 feet on the bar; in 1858 I found that its drift had been brought about 1½ mile lower down, and that there was only 1½ to 1¾ foot of water on the bar; the bottom had also become so soft and oozy that it was with difficulty that we drew our feet out of it.

Along the banks of the Taldyk there are many fine meadows, and many cultivated fields and melon-grounds.

The fortified town of Kungrad, the principal bazaar and centre of administration of the province of Kungrad, is situated on the left bank of the Amu-Daria. Its population numbers from 6000 to 8000, and consists of Uzbeks, Sarts, Kirghizes, and Karakalpaks. Besides the so-called Khan's Palace, with its fine garden, occupied by the governor of the province, the principal mosque and large caravanserai, all built of lumps of clay, there are no remarkable buildings; the houses of the inhabitants are mean-looking, the streets narrow, crooked, and dirty, and mal-odorous. Around the town spread fields, gardens, and melon-grounds, all of which are artificially irrigated.

My first examination of the Taldyk mouth was in 1848. In order quicker to ascertain which of the passages was navigable, we forded the greater part of them during the day, in which work no one molested us; but two days after, when we examined the remaining channels, we were closely watched by 50 Khivan horsemen, who had been sent by the Khan to seize me, dead or alive. They rode along the bank off which I was taking soundings from a boat; and although we were only five they did not dare to attack us, but tried to allure us on shore. We conversed together very amicably. I told them we were fishermen and wished to trade with them: on their part they invited me to land, offering me rice, fruit, &c. for sale. Perceiving, however, that having accomplished our object we were retiring, they grew furious, and, dismounting, waded into the water after us with their guns. But it was too late—we were already quite out of reach: all they could do was to send a volley of abuse after us, to which my sailors humorously responded. Some Kirghizes, who had shifted their encampments to the Syr-Daria, subsequently gave me the following somewhat original account which they had heard from the Kara-kalpaks of my appearance at the mouth of the Taldyk —

"At daylight a high white mountain appeared at sea, the summit of which spoke with the skies: this mountain continued to approach the shore, it then suddenly stopped and dived under water (I lowered sail and came to anchor). Instead of the mountain there appeared a large boat: this large boat soon gave birth to a little boat, in which a Russian "turin" (commander) rode backwards and forwards on the river, poking black poles into the water. (I took the depth of the water with a black measure, on the side facing the sea.) When the boat had disappeared, the "batyrs" or horsemen sent by the Khan strictly ordered the Kara-kalpaks to pull out these black poles so that they might be sent

to Khiva, but, in spite of their diligent search, they found nothing; seemingly they must have been bewitched."

The fame of my supernatural power extricated me more than once from positions of very great danger. Thus, in 1859, I found myself with my steamer in the Ulkun-Daria, in the very centre of the whole Khivan army, commanded in person by the Khan, and unluckily whilst proceeding up this river I got aground.

The Khivans numbered 10,000 men, and had 10 brass guns which had been cast and moulded by a runaway Russian artillerist. I was ready to repel any attack, but refrained from firing the first shot. The Khivans, who rode up and down in front of my steamer for more than three hours, and who had examined to number their guns on a spit of land facing us, suddenly limbered up again and withdrew with their guns to their chief camp. After this about 400 mounted Turkmen, mostly armed with double-barrelled English guns, paraded before me—these were followed by a body of about 500 barefooted infantry soldiers in red jackets, armed half of them with matchlocks and the other half with pikes. A big Turkish drum was carried at the head of the detachment. In this way the obstacles to my further ascent of the river were removed by themselves. I afterwards ascertained that at the military council of the Khan, who was in favour of opening fire upon us, one of the chief Uzbeks said:—

"What is the good of firing at the Russians, who are doing us no harm? Suppose we do even kill and wound several of them, what will be the good of it? The 'I't-kay-ik' (fireboat) of these infidels is of iron, which with them is made even to float, and our shot will consequently fly off (the sides of our vessel were only one-eighth of an inch thick). It is not those guns which we see that are dangerous, but those black holes out of which they will fire such infernal things to destroy us all." These terrible holes were only the apertures in the cabins.

The Ulkun-Daria, which discharges the greater portion of the waters of the Syr Daria into the sea of Aral, falls into the latter by two branches. The western one is called the Kitchik-Daria. The point of bifurcation of the two branches is at Tenké-Kumu settlement, about 6½ miles in a straight line from the sea.

The Ulkun-Daria takes its rise in the reedy lake of Airtun-Kul, which is fed at its upper end, and out of which is discharged in a stream, 15 fathoms broad and 1 fathom deep, the principal mass of waters of the lake. This stream further on branches off at a sharp angle into two parts, forming on the right the Ulkun-Daria, and on the left the narrow water-course of the Kuldan, which flows for a distance of about 27 miles and

then falls into the Taldyk a little below Kungrad. In 1858 the greatest depth of the Kuklun was 4½ feet, while in 1859 there were only 2½ feet at full water, and it was being overgrown with reeds, the body of water by which it had been fed was diverted into the Ulkun-Daria.

The Ulkun-Daria is fed by affluents, which increase in size in proportion to the extent of its course and issue out of the well-supplied lakes above. Thus 2 miles below its source, at Menken-Bagó village, its breadth is already about 80 fathoms, with depths of 1, 5, and 6 feet, whilst 20 miles lower down its breadth is from 120 to 180 fathoms, with depths of from 3, 4, and 5 fathoms. The height of Kubi-Tau Mountain, opposite to which the Ulkun-Daria makes considerable bends, is about 80 feet. On its eastern slope is a cemetery, full of strange tombs and monuments in the shape of cupolas, square towers, &c.

The mass of water of the Ulkun-Daria continues to increase from the right by the impouring of large streams flowing from lakes. These streams bear the common name of Kik-Uziaks, and are from 15 to 25 fathoms broad and from 6 to 7 fathoms deep. The banks of the river above Kubi-Tau Mountain, opposite the Kuk-Uzaks and below them, are covered with gardens and cultivated fields, particularly the left bank. The river is also bordered by many houses, surrounded by willow, apricot and tall poplar trees. The inhabitants are nomadic, being composed of Sarts, Uzbecks and Karakalpaks. A diun extends along the edge of the depressed bank, which retains the water during the floods and enables the natives to irrigate their fields and gardens at all seasons of the year.

The body of water in the Ulkun-Daria does not decrease over its course of 47 miles to the point where it throws off the Kazak-Daria, on which stands the small fortress of Chimbai. Its banks are thickly overgrown with the "djda," willows and prickly shrubs, and become flooded at high water; the thick brushwood is frequented by wild bears, tigers, and jackals. The breadth of the river is from 150 to 200 fathoms, and the depth in some places reached 7 fathoms, the current was from 3 to 3½ knots, or nearly 6 verstas per hour.

Below the Kazak-Daria the banks are again drier and firmer; large fields with meadows intervening, occasionally border the stream. The population here consists principally of Karakalpaks; there are also a few Kirghizes.

In 1859, when the whole region was panic-stricken by the depredations of the Turkmen, who had dispossessed the Khan of Khiva of Kungrad, the Karakalpaks erected several quadrangular earthworks in which they crowded their tents. The

largest fortified encampment of this kind, consisting of 1000 "kibitkas," or tents, was at Tenké-kumu point.

The soil along the lower course of the Ulkun-Daria is saline-argillaceous. Fields border the banks of the river, and herds of cattle were seen in the country beyond. The Karakalpaks, who are principally employed in agriculture and only rear sufficient cattle for their absolute wants, appeared to be in a prosperous condition: the Kirghizes, however, were generally very poor. The number of the latter decreases annually, owing to their emigration to Russian territory along the line of the Syr-Daria.

In 1859 I passed out of the Ulkun-Daria, through the lower Kuk-Uziak and the lake and stream of Karabaili into the chief course of the Amu-Daria.

The lower Kuk-Uziak at its fall into the Ulkun-Daria is about 30 fathoms broad and 7 fathoms deep at the full-water season. After ascending it for $2\frac{1}{2}$ versts I found that it consisted of the junction of two branches: the source of the right is lost in the reeds, but through the left, notwithstanding its narrowness and sinuosity, I succeeded in entering Lake Kam-Kul. It cost no great trouble to advance through the dense masses of reeds which grow over depths of 6 and 7 feet: at one part it took me a whole day to steam a distance of $2\frac{1}{2}$ versts.

The saxaul shrub grows very plentifully at Kushkanat-Tsu hill, the elevation of which is about 150 feet. Beyond it my course lay partly through compact masses of reeds and partly through the open waters of lakes Ak-Kul and Mamet-Kul, in which I encountered many shallows and firm islets: in some places the limpidity of the water enabled me to see submerged fields and artificial water-courses, which proved that these parts had formerly been cultivated and subsequently become submerged in consequence of the rupture of the dams, or owing to a change in the course of the river. The channels were frequently narrow, winding and shallow—sometimes less than 4 feet, though this was at the end of August, when the waters generally subside to a considerable extent.

When in sight of Burly Hill, an elevation of about 40 feet, covered with numerous tombs, I determined to leave my principal surveying force behind me, and to proceed forward in a small steamer of 12-horse-power, in which I penetrated through the reeds into the Karabaili channel, and from thence into the main stream of the Amu-Daria.

The Karabaili branches off from the Amu-Daria on the east, at about 40 miles below the town of Khodjaili, and I then united with it again within about 20 miles below Kuugrad. The portion I passed through was lined with firm banks, which, how-

over, become submerged during the floods. Its breadth varies from 20 to 40 fathoms, with depths at a period of low water from 3, 4, 5, to 7 feet. On both banks there are fields, gardens, and melon-grounds, and apricot and poplar trees grow along the margins.

After passing the ruins of the deserted town of Old Nukus-Bazar, and proceeding $3\frac{1}{2}$ miles beyond it, we suddenly, on coming round the bend of the river, saw before us the newly erected fortress of New Nukus, with crenelated wall $2\frac{1}{2}$ fathoms having been about 200 fathoms in length. This unexpected sight rather surprised us, and made us come to a dead stop; finding, however, that, on more careful examination, there were no guns mounted on the walls, we started forward again at full speed. This occurred at eight o'clock in the morning, on a bazar day; the banks were crowded with people, and a shoal of boats filled with vegetables, firewood, melons, bags of millet &c., stood moored in the river, opposite the fortress. The appearance of my little steamer was to the Khivans an astounding surprise, and they gazed on the strange phenomenon in mute astonishment. As I was passing the fortress, an officer hurried out to the river-bank with an invitation that I should pay the Bek, or commandant, a visit. I replied that I was proceeding to Khedjail; but that on my way back I would certainly pay a visit to the Bek, of whose wisdom and great virtues I had heard so much. We advanced at the same time slowly forward, our progress being occasionally impeded by shoals on which we ran aground. After passing about 21 miles, we reached the commencement of the Karabakh, where it branches off from the Amu-Daria. I here stopped the engines in order to make a mid-day observation of the sun for latitude, then entering the main stream of the Amu-Daria, I hoisted the Russian colours, and steamed from one side of the river to the other.

At this point the breadth of the river, which is considerably lessened by the separation higher up of the Kuk branch, and of several small streams on the right, is about 200 fathoms; the depth, notwithstanding the considerable fall in the level of the water, was from 5 to 7 feet, and the current about $2\frac{1}{2}$ knots ($3\frac{1}{2}$ versts) per hour. The banks are low; the right bank is covered with the willow and "djuda," and the left with reeds. No inhabitants were to be seen.

Having in our rear a Khivan fortress, the garrison of which it was to be expected would soon recover from the panic caused by our appearance, I did not consider it advisable to tarry long in these waters, so, after making an observation of the altitude of the sun for longitude, we got up full steam, and sped rapidly

down the river with the current. The horseman, who had easily followed us when we were feeling our way up-stream, was now obliged to gallop hard, but the uneven country and the numerous canals checked his progress, and he lagged far behind, so that he reached the gate of the fort when we had already long passed it, and when it was too late to adopt any measures for arresting our progress. A Khivan officer, in a high sheep-skin hat and bright silk robe, galloped after us on a horse which he had hurriedly mounted without a saddle (evidently we had not been expected to return so soon), and shouted to us that the Bek expected us to visit him, that he had prepared an excellent repast, that we ought not to disappoint him, and so forth. I continued my course however, without stopping, and answering the officer that I was sorry not to be able to visit the Bek on that occasion, sent him my compliments, wished him good health and much happiness, and soon disappeared. We only saw at a distance that the horse of the Khivan envoy came to a dead stop at a broad ditch full of water, and how the rider tore off his hat from his head in despair, and dashed it to the ground.

The depth of the bar of the Ulkun-Daria is subject to constant change; crossing it in July of the year 1856, I found only 2½ feet of water, and was obliged to unload my steamer entirely, and to send out men with spades to dig out a channel, through which we advanced men by men. In August and September, however, of the same year there were 4 and 1½ feet on the bar, and I easily stemmed over it.

Besides the four principal mouths of the Amu-Daria, viz., the Aitangir, Falyk, Ulkun-Daria, and Yangy-Su, there are several other intermittent embouchures which open into the sea, but these are all very small, shallow, and are covered with rocks.

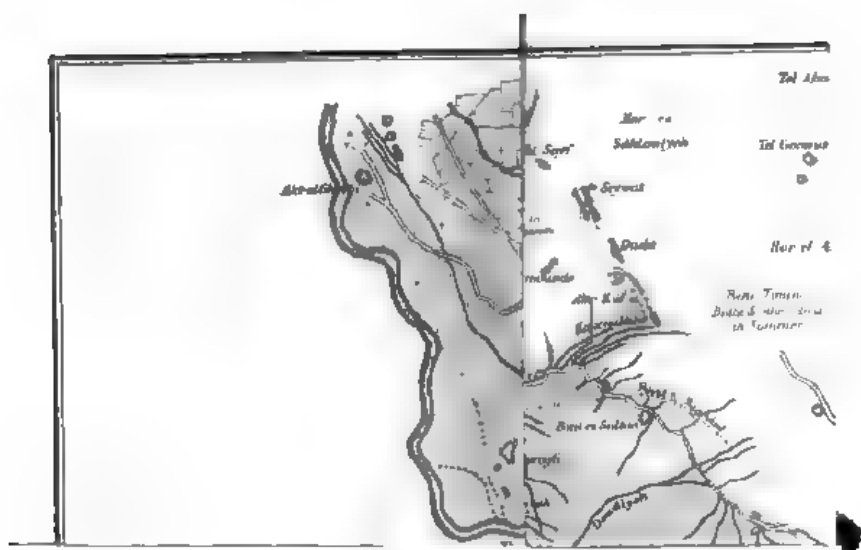
VIII.—*On Part of Mesopotamia contained between Sheriat-el-Beytha, on the Tigris, and Tel Ibrahim.* By Lieutenant J. B. BEWSEHER, Surveyor in Mesopotamia.

Inst. April 8, 1867.

THE sheet of the survey of Mesopotamia, which has just been completed, extends from Sheriat-el-Beytha, on the Tigris, 10 miles north-west of Bagdad, to the large mound of Tel Ibrahim, nearly in the centre of the Jezirah (or Mesopotamia), and 19 miles S.E. of Hillah. This is the northern point in the sheet, completed by Lieutenant Collingwood.

The work was taken up by Commander Selby and myself in





the autumn of 1862. Several things occurred to prevent the completion of the sheet till the autumn of 1865. In the first place, the Montfith rebellion rendered the country unsafe for a time. As soon as this affair was settled, my services were required by the Political Agent in connexion with the telegraph then being erected between Baghdad and Basrah. When I was again able to go on with the survey, Commander Selby had retired, and I had succeeded him as surveyor in Mesopotamia. In attempting to give a brief description of the country contained in this sheet, I purpose following down, as far as possible, the course of the old navigable canals which can still be traced. I shall confine myself almost entirely to a description of the ancient streams, canals, and ruins; for the present appearance of the country offers a sad contrast to the Mesopotamia of Greek and Roman authors, or even to the Jezireh of the time of the Abbasside Khalifs of Baghdad. Little need be said of the few modern canals and scant cultivation of the present day.

In the north-east corner of this sheet, and less than a mile and a half from the Tigris, is the bed of an old stream, now called *Es Sook*, or *the Bazaar*. It runs down towards Baghdad, the environs of which city it formerly supplied with water. It appears to have been regularly built, as runs run along both banks till within a mile and a half of the town (or suburb of Baghdad) called *Kathemain*. It is supposed by Clémey to be identical with the *Ishaki canal*, dug, according to *Abul Feda*, in the time of the Khalif Muta Wakkel (A.D. 850) by *Ishak ibn Ibrahim* ('Expedition to the Euphrates and Tigris, vol. i. p. 27). Its present name of *Es Sook*, or *the Bazaar*, is given to it by the Arabs, from its bearing, in places where it has been deepened, some fanciful resemblance to a bazaar. This name is not an uncommon one apparently for old canals, there being two so called close to Baghdad.

I may here remark that, as a rule, the canals which appear to have been navigable have low banks, but slightly raised above the surrounding level. They generally wind considerably, and have runs on their banks, often lining them for miles. In some places, near large ruins, they appear to have regularly built sides. From these streams irrigations were given off, and led over the country in every direction possible. These have frequently high banks of from 20 to 30 feet, and in some instances even higher. This is accounted for from the fact that the running streams were kept clear by the rush of water through them; whereas the derivations from them were only used during the spring or early summer, when the rivers are high. These had to be cleared out yearly of the deposit left by the muddy waters. This was heaped up on the sides till they had reached such a

height that it became less laborious to dig a new canal than to travel up the steep sides of the old one with the mud dug out of the bottom. Thus five or six canals, with formidable high banks, may be seen running side by side for miles, the parent stream being so indistinct that at times it is difficult to trace it. This system of deepening and digging new canals is carried on at the present day.

The supposed navigable canals or constant streams are marked, on the map, with two open lines, the supposed unused irrigants with black lines. The ruins on the banks of the Sook are so considerable that several have supposed the site of Sittaki to be here. Though the swamp from the Saklawiyeh canal has done its best to obliterate these ruins, yet the country around is still covered with bricks and debris of buildings, to such an extent that there are at first sight good grounds for this supposition.

There are two fountains along the line of the Sook which have apparently been made by the rush of water from the Saklawiyeh marsh. They are half a mile apart. The southern one is called *Am*, or *Amul* *Hulawiyeh*, and the northern, *Am Serakha*. *Am* is the Arabic for a spring of water. The *Serakha* pond is about 180 yards in diameter, and so deep that water remains in it all through the hot season. On the eastern bank there is a ruin completely below the level of the ground. It is composed of bricks embedded in bitumen. These are 13 inches square, and 2½ to 4 inches thick; they are cut out of the bitumen in which they are embedded, and carried to Baghdad for sale.

The town of *Kathemain* is clustered round, and derives its name from, the tomb of two Imams buried there. These are *Imam Musa el Kathem*, the seventh in direct descent from *Fatima*, the daughter of the Prophet, and his grandson, *Mahomed bin Ali Keza*, surnamed *El Fakr*, or the Pure. The tomb consists of two domes, covered with gilt tiles, and four minarets, very prettily built with enamelled tiles. The whole is enclosed within four high walls, which partially hide the sacred precincts from the eye of the unbeliever. From a distance the domes present a very beautiful appearance, and serve as landmarks for many miles.

Kathemain contains about 15,000 settled inhabitants, whose numbers are swelled by influx of pilgrims. These are all of the sect of *Shiaks*. Four miles to the south-east of this shrine stands the tomb of *Zobeyda*, the favourite wife of *Harcun el Rashid*, a name familiar to all readers of the '*Arabian Nights*.' This has been piously kept in tolerable repair up to the present time, and was accessible not many years ago, but the entrance is now bricked up.

A survey of *Baghdad* and its environs on a large scale was

made by Commander Jones and Mr. Collingwood, of the Indian Navy, and forwarded to Government, with a memoir on the province. These were published in the Bombay Government Records, No. XLIII. It will be sufficient to note here that Bagdad was built in the year 45 of the Hégira (A.D. 762), by Mansoor, the second Khalif.

The accounts given by the Arab historians are both interesting and amusing. Many of these stories concerning the building of the town and the events that occurred during the reigns of the Abbassid Khalifs, have found their way into 'Orichton's Arabia' and other works.

In A.H. 656, Mustassem Billah, the last Khalif, was put to death by Hulaku Khan when he captured the city. Most of the public buildings were then destroyed, and it is probably due in a great measure to this prance that Bagdad of the present day shows but few traces of its former magnificence.

After being taken and retaken by the Turks and Persians, Bagdad was finally conquered by Sultan Murad IV., in A.D. 1638. "Since that period," to quote Orichton, "the once illustrious city of the Abbassides has been degraded to the seat of a Turkish Pashalic." Among the few remaining ruins that mark the Abbassid dynasty in Bagdad may be seen the Medressah or College built by Mustassem, in the year 630 of the Hégira (A.D. 1232). The inscription on it is being now restored. One of the oldest buildings in the town is the minaret of a mosque called Jama' es Soof el Ghuzi, after the thread-market near which it is. Commander Jones determined the position of this minaret, which he gives in his map of Bagdad, as in lat. 33° 20' N., long. 44° 25' E. Close to the westward of Bagdad are several deep openings of the Saklawiyeh canal, or, more properly speaking, of the marsh formed by the Saklawiyeh. Through one of these, Masoodi Captain Lynch brought the *Euphrates* steamer in 1838. The Saklawiyeh is now closed, both on the Euphrates and Tigris.

The large and conspicuous ruin now called Akr Kûf is 10½ miles, a little north of west, from the bridge of boats at Bagdad. This ruin is composed of sun-dried bricks, 14 inches square and nearly 4 inches thick. Between the layers of bricks is one of reeds or mats, and between every seventh and eighth an extra thickness of these reeds can be noticed. This mass of sun-dried bricks is solid to all appearance, is nearly square in shape, and stands on a ruin of apparently kiln-burnt bricks and lime. It is surrounded by extensive ruins, which have been partially opened by Mr. Loftus.

A canal appears to have passed close to the eastward of Akr Kûf, but as I have traced it till it was lost in the Saklawiyeh

swamp, I am unable to say from which river it came. Akē Kūf is spoken of by Chesney, and also in Rawlinson's '*Ancient Monarchies*,' as being on the Saklawiyeh. It is supposed by General Rawlinson to be the ruin of a Parthian town occupying the site of an earlier Chaldean city (Note to p. 27, vol. i. '*Ancient Monarchies*'). It is marked in Chesney's map as the ruin of Agrad of the Bible, and in Mr. Rawlinson's work as the site of Duran. Its summit is now 126 feet above the level of the raised ground near it, and the shapeless mass can be distinctly seen from both rivers. Yakuti, speaking of Akr Kūf, says it was supposed in his time (about A.H. 613) to have been the burial place of Sassanian kings.

The Abu Ghurraib is a modern canal, now in use, emanating from the Euphrates at a point 34 miles west of Baghdad, and about 68 miles direct from Hillah. This canal appears to have been cut in the bed of the Nahr Aessa, an old canal of the time of Mursoor, the founder of Baghdad. The Saklawiyeh canal, which leaves the Euphrates about 6 miles above the Abu Ghurraib, is supposed by Chesney ('*Expedition to the Euphrates and Tigris*, vol. i. pp. 32 and 55), and others quoting him, to correspond with the Nahr Aessa. My reasons for thinking that the Abu Ghurraib and the Nahr Aessa correspond are as follows:—There is a ruin of a tomb now in existence on the Abu Ghurraib canal, which is described in the '*Majma' el Bulcan*' of Yakuti as being on the Nahr Aessa. Besides this evidence, there is that of the Zabiha Arabs, the present cultivators of the Abu Ghurraib district, who frequently told me that their canal was cut in the bed of an older stream called the Aessa. Chesney considers the Abu Ghurraib to coincide with the Nahr Serser of Abul Feda (Map No. 7 of the *Scrin*, and vol. i. p. 55 of his work), yet, in the next page, he says the Abu Ghurraib corresponds with the El Melik, a canal to the southward, which I will presently describe; also at p. 281, vol. i., where he says the ruins of Hush are on the Nahr Melka; these ruins he has previously identified with Sudiye, and placed them on the Abu Ghurraib or Nahr Serser. There is great confusion in the letterpress as to these canals, but in the map they are very distinct, and the Abu Ghurraib is marked as the supposed Nahr Serser of Abul Feda. Either of the two canals now called Abu Samak and Sudiye might correspond with Abul Feda's Serser. These may have been cut in the bed of older streams, but they had not sufficiently the characteristics of navigable canals to warrant my marking them as such. The old name of Serser as applied to a canal seems quite unknown to the present Arabs.

Abul Feda says the Serser left the Euphrates below the

Acossā till it comes to Serser, which is described by Edrisi as a flourishing commercial town, 9 miles from Baghdad, on a navigable canal on which there is a bridge of boats. After watering all these countries, he says, it joins the Tigris between Baghdad and Modain ('Expedition to the Euphrates and Tigris,' vol. i. p. 56). Yakuti, in the 'Majm'ul-Buldan,' says "Serser—two villages within the limits of Baghdad, the great Serser and the little on the Nahr Acossā, and sometimes called the *Nahr Serser*, and the distance between the little Serser and Baghdad is two fersakhs, and it is on the road to the Haj from Baghdad, and was called in former days Serser Ed Dair."

Where two such good authorities as Abul Feda and Yakuti disagree, it is difficult to form an opinion; but it seems probable that the Nahr Serser was a branch of the Nahr Acossā.

At a place called Manfuth (meaning a place where water flows), the old stream which I have thought was the Nahr Acossā bifurcates, one branch going on to the Tigris, a little south of Baghdad, and the other taking a more southerly direction. There are ruins in great abundance at this spot,—in fact, in wonderful profusion; and the distance from Baghdad of 17 miles almost corresponding with that given by Edrisi, they might very probably be the ruins of the town of Serser,* in which case the southern branch canal might be the Serser, as described by Yakuti.

Semadiyah, or Sindiyeh, which I have previously mentioned, is the ruin of a handsomely-built mosque or tomb. It is on the Abu Ghurrah, and is distant 20½ miles from Baghdad, from which it bears about N.W. It is falling fast into decay, the dome having fallen in. Yakuti mentions this place, and says that it took its name from a man of Sindwan, who was in charge governed the district; and he seems to say, for he is not very distinct on the subject, that this man died there in A.H. 503. The tomb is apparently of a later or Abbasside time. The appearance of the ground in the neighbourhood would show that this, as most other buildings now standing, was erected on others then in ruins. This spot was visited, according to D'Anville, by both Balbi and Texeira. A mile and a half to the eastward of Semadiyah a branch canal leaves the Acossā, going to the northward; it is called the Akram, and has every appearance of having been a permanent or navigable stream, as the ruins on its banks are very considerable. I have only traced this stream 7 miles from the fork, as my work ends there. I may be wrong in saying this stream came from the Acossā, for I had no level and have not ascertained the dip of

* "Serser" Arabic for cricket.

the country. This is generally from north to south, and I may find that this canal took that course.

There are several very peculiar old beds of streams or canals to the westward of Senadiyeh, such as I have only met with in this part of the country. They are 35 to 40 paces broad, and run for miles in a perfectly straight line. They have no ruins on their banks, and in a distance of 30 miles have only two branch canals emanating from them. Had it not been for these two canals I should have taken them for old embankments, although they are now only a foot or two above the level of the ground. The Arabs use them in the winter, when the ground is swampy, as roads, and call them all "*Tawael*," which is the diminutive of the word meaning length. They have no idea what they were for, or when they were used, and they are equally a puzzle to me. I have marked them, on the map, with two open lines as navigable canals.

Four miles to the westward of Senad'yeh is a mound called Kuneeseh, or Kunaseh. This name at once attracted our attention, from the fact of the battle of Kunaxa having been fought in the neighbourhood, and from the strange similarity of the two names, Kunaseh being the nearest approach that an Arab could make to Kunaxa. In a country where names of mounds are frequently changed—except, indeed, the larger ones—it seems improbable, and almost too good to be true, that this one particular spot, the site of which has been so long sought for, should have kept its name intact for nearly 2300 years.

Chesney and Ainsworth, who have been over the very ground, have not noticed the name of Kuneeseh, which is the more remarkable as this mound seems to correspond with that called Abu Ghurrah in the map of the expedition under Chesney. Kuneeseh is the Arabic for "church," and I believe the Hebrew word is very similar. I venture to think that the name Kunaxa, given to the battle on the authority of Ptolemy, may be a corruption of the Hebrew word, and that the battle was actually fought at this spot. There could not be a better authority on this point than Mr. Grote who says, "Following, therefore, the distance given by Ptolemy (probably copied from Ktesias), we should place Kunaxa a little lower down the river than Pelusid; this seems to be most probable supposition" (*Grote's History of Greece*, vol. ix. note 2 to p. 56). The mound of Kuneeseh is 17 miles from Beluzah, and 51½ in a direct line from Babel, the northern mound of those marking the supposed site of Babylon. This agrees, as nearly as may be, with the 500 stadia of Ptolemy, which he gives as the distance between the two places.

Whether this supposition be correct or not, there is nothing.

I think, in Xenophon's account of the advance or retreat of the Greeks that would disprove it. In following the tracks of the Greeks, I will take Pylæ as a starting-point. This is marked in Chesney's map as 22 miles from Hit. Commander Jones, of the Indian Navy, a former surveyor in Mesopotamia, thinks it should be identified with a place called Bekaa (9½ miles to the south-eastward of Hit), from the fact of the Arabic word *Bekaa* having about the same meaning as the Greek Pylæ, and from the fact that there is actually a narrow pass at that place ('Bombay Selections,' No. XLIII., p. 263, note). From Pylæ the Greeks in three days marched 12 parasangs; then, in one day, 3 parasangs. It was in the middle of this march that they came to the trench supposed to have been cut by Artaxerxes, and passed it by a narrow passage of 20 feet. This description will exactly apply to an irrigating canal in the process of construction. A passage of about 20 feet broad is always left to keep out the water of the river while it is being dug, or till the time for watering the land arrives. Further on, Xenophon says it was not the time for watering the crops (p. 88, 'Speiman's Xenophon'). As to the trench extending 12 parasangs to the Median wall, this could only have been stated on hearsay evidence. Xenophon then mentions the four canals which are in the plain. Chesney seems to lay great stress on this passage, for, in vol. ii. p. 213, he says, "The Isā, the Nahr Semei, and other canals were so many successive lines of defence." Whereas these canals were cut more than eleven hundred years after the battle. Mr Grote, in the map accompanying the 9th volume of his 'History of Greece,' has placed these canals to the southward of Kunaxa. He also notes that Major Rennell, Ritter, Mr. Ainsworth, and Chesney, have wrongly interpreted the words of Xenophon, who does not say that Cyrus ever passed the wall of Media or these four canals before the battle of Kunaxa ('History of Greece,' vol. ix. p. 88). Xenophon says the water was derived from the Tigris and fell into the Euphrates, and he repeats this statement about the two canals passed after the battle. This seems to be a mistake, as all the canals in this part of the country would, from its top, be necessarily cut from the Euphrates to the Tigris. To continue in the footsteps of the Greeks. They had already marched from Pylæ 15 parasangs, and if 7 parasangs are allowed for the next two marches, it will give 22 parasangs from Pylæ to the field of battle. Bekaa is distant from the mound of Kuneesh 50 miles, in as straight a line as it is possible to go. This divided by 22 would give nearly 2½ miles to the parasang, which is about correct. It is worth noticing that the pebbly ridge close to Kuneesh would exactly answer to the descrip-

tion of the hill mentioned by Xenophon, on which Artaxerxes' cavalry made a stand after retreating from the Greeks. Mr. Ainsworth, in his *Track in the Footsteps of the Ten Thousand*, says he supposed this eminence to have been a tel or artificial mound, as there are no natural mounds in the country; but he is mistaken in this latter assumption, for the ridge I allude to is 13 miles long and 80 feet high, if not more.

The direction of the retreat of the Greeks from their encampment, a day's march to the north of the battle-ground, has given rise to much discussion. Xenophon says "as soon, therefore, as it was day, they began their march, with the sun on their right" (*Speusippus's Xenophon*, p. 84). This, at first sight, would appear to be a northwardly or north-north-eastwardly direction; and the difficulty is to reconcile this with the very next words, "expecting to arrive by sunset at some villages that lay in the country of Babylon," and with the fact that they did eventually arrive at Sittaki, a city on the road between Babylon and Susa, or to the eastward of the former city. Mr. Grote thinks that by the sun on their right hand was meant the mid-day sun (*History of Greece*, vol. ix. p. 76, note). Is it not possible that the Greeks may have made a detour, wishing to avoid the troops of Artaxerxes, and, perhaps, keeping the paddy fields between the enemy and themselves?

The position of Sittaki has been variously placed. Chesney supposes Sheriat-d-Beytha to have been the site (vol. ii. p. 22). Sir Henry Rawlinson, on the testimony of Captain Jorda, thought that the western suburbs of Baghdad were built on the ruins of Sittak (Cantonment Government Records, No. XLIII. note to p. 3). Mr. Grote has placed them on the eastern side of the Tigris, and about 3 miles to the southward of Baghdad (map accompanying vol. ix.). Mr. Rawlinson, in the map prefacing the first volume of his *Ancient Monarchies*, has placed Sittaki, or Psittak, 33 or 34 miles to the south-eastward of the Diyaleh river, and on the eastern bank of the Tigris.

St. John says that Sittaki was on the road from Babylon to Susa, and 600 stadia from the former city. I shall venture at present upon no opinion of my own as to the proper position of Sittaki, but shall suppose it to have been near that marked in Mr. Rawlinson's map. As I have only seen the first volume of the *Ancient Monarchies*, I do not know what ruins Mr. Rawlinson supposes to have marked the site, or by what name they are now known. Some ruins on the eastern bank of the Tigris, now called Deir, might correspond with Sittaki of Mr. Rawlinson. The Tigris flowed at one time apparently to the eastward of Deir; for Lieutenant Collingwood, who surveyed the country opposite this ruin, and traced canals running towards it, says,

"I traced straight on towards the river, and from the top of 'Abdulla,' a mound a little to the southward, saw mounds on the opposite bank leading to Deir evidently the continuation of the canal. The other canals I did not quite follow to the banks—high brushwood intervening; but they all centered in the same spot, and the people there informed me that they all reappeared on the opposite bank" (Extract of a letter to Colonel Kemball, C.B. Political Resident, Bagdad). The mounds of Deir are situated, according to Lieutenant Collingwood's map, at a distance of 57,000 yards from Babel, and 66,000 yards from the mouth of the Diyala River, near which spot Mr. Rawlinson places Opis, and to which I shall allude further on.

The Greeks, after three days' march, passed the wall of Media. The position of this wall has been much discussed. From the discoveries of Captain Lyne and Dr Ross it was supposed that the ruins of the Median wall could be traced stretching across from the Tigris at latitude $31^{\circ} 3'$ N., in a south-south-westerly direction to the Euphrates. Commander Jones, who examined the spot in 1850, says of it, "Neither in its construction or extent will it in any way answer the description of the ancient writers" (Bombay Government Records, No. XLIII, p. 233). Mr. Grote quoting this, says, "From this important communication it results that there is as yet no evidence now remaining for determining what was the line or position of the wall of Media, which had been supposed to be a *datum* positively established, serving as premises from whence to deduce other positions mentioned by Xenophon" (vol. ix. note p. 88). A line drawn from Te. Kunceseb to the ruins of Deir would exactly touch the ruin of a wall now called Habb-es-Suchr, or line of stones or bricks. The ruins of this wall may be now traced for about $10\frac{1}{2}$ miles, and are about 6 feet above the level of the soil. It was irregularly built; the longest side running E.S.E. for $7\frac{1}{2}$ miles, it then turns to the N.N.E. 2 miles, then east $1\frac{1}{2}$ mile, turning down S.S.E. for another mile and a half. An extensive swamp to the northward has done much towards concealing this wall. The two caravanserais at Khan-ez-zad are also in a great measure built of bricks from it, and it has doubtless supplied materials for many other buildings. There is a considerable quantity of bitumen scattered about, and it was probably made of bricks set in bitumen. I can see nothing in Xenophon which would show that this is not the wall the Greeks passed, for what he says of its length was merely what was told him. I think that this must be the ruin of the wall called that of Media which Xenophon describes; but I mention this supposition with much diffidence, and for the benefit of those better able than myself

to judge of its being correct. The distance from the northern point of this wall, as now seen from the encampment, might be allowing for a detour, about 32 miles. Whether this was done in three or four days' marching has been disputed, but I do not think that this is of much importance either way.

"From thence they made, in two days' march, 8 parasangs, and passed two canals, one upon a bridge and the other upon seven pontoons." These two canals might have been the Nahr Malka, and the old canal, the bed of which is now called Habi-el-Dihhah. This latter was either a continuation of the Nahr Malka or a stream from the Tigris.

Allowing the 8 parasangs to be 24 miles and that the Greeks crossed the second canal at the end of these marches, they would have done so at a point nearly 12 miles south of Ctesiphon, and nearly 15 miles from Deir, which I have already said seems to mark Mr. Rawlinson's Sittaki. Xenophon, after stating that they crossed these canals, says, "thence they came to the river Tigris near which stood a large and populous city called Sitace, at the distance of 15 stadia (1½ mile) from the river" ('Spelman's Xenophon,' p. 34). It seems to me that another day's march could be allowed from the canal crossed, by a pontoon bridge. The island on which Xenophon says Sitace stood would have been formed by the Tigris on one side, the old stream now called Habi-el-Dihhah on the other, and, perhaps, two branch canals. After crossing the Tigris the Greeks marched 20 parasangs in four days to the river Phrysus, on which stood the large town called Opis. The position of this spot has not been determined as yet. Mr. Rawlinson, in his map (accompanying vol. i. of his 'Ancient Mesopotamia'), puts it on the Diyakh, which he supposes was the Phrysus, and about 3 miles from the Tigris. Chesney has placed it 57 miles to the northward of Baghdad, close to one of the heads of the Nahrwan canal. Captain Lynch, of the Indian Navy, had previously supposed it to be on the same side of the Tigris (the eastern), but about 19 miles more to the eastward (Map No. VII. of the 'Expedition to the Euphrates and Tigris'). Mr. Grote has given Opis the same site as Chesney apparently (map in vol. ix.). Commander Jones, in a paper sent in to Government in 1851, announces the discovery of the site of the ancient Opis, which he supposes rather confidently to be marked by the ruins at a place called Mansûr, about 38 geographical miles north of Baghdad (Bombay Government Records, No. XLIII., p. 215). I have mentioned where Mr. Rawlinson places Opis, but I am unaware what ruins he supposes mark the site. Whether I am correct in any of the suppositions I have mentioned or not, I think I

am justified in saying that nothing but a very careful survey of the country to the northward will ever be of any use in determining whether the positions at present assigned to any of these places be correct. The matter will not, I imagine, be considered decided as long as it is uncertain what evidence may be obtained from the country to the north-west of Baghdad, which is as yet unsurveyed. In a casual trip across the country important ruins might be very easily overlooked; and it is notorious how little the statements of the Arabs can be trusted, when from laziness or fear of other tribes they wish to avoid exploring the country. Commander Jones seems to have found this to have been the case when he was examining the embankment supposed to have been the Median wall.

Five and a half miles to the east-south-eastward of Kunesseh are the remains of what appears to have been a house or fort, surrounded by a rampart. A small mill of pebbles has been taken advantage of to build it with. The walls or ramparts are about 18 feet high, and have others projecting from them. The main ones surround the building or ruin, the whole covering about a square mile of ground. Less than a mile to the eastward is another similar ruin, but smaller. They are both known by the name of Dewair, which is the diminutive of Dour, a creek.

There are two very high mounds in this neighbourhood, both called Akr or Akar. Akar-el-Ajedeh* is $1\frac{1}{2}$ mile east of Kunesseh, and is a most imposing-looking mound. It is built of kiln-dried bricks, and is 74 feet high, by far the highest in the area comprised by my map. It does not cover much ground, being 220 yards long. The other Akr, which is distinguished from its namesake by the word Garbi or the west, is in the north-west angle of the map, and a little north of west, distant 9 miles from Akar-el-Ajedeh. This mound is built of sun-dried bricks, and is not so large as the other one.

The mound of Kunesseh is about one mile in length, and about 35 feet high. It is separated by a chasm into two parts, and is covered with a loose nitrous soil called in Arabic Subab. Indeed, the country close to the southward is as white with sulphureous soil as it had been covered with a thick fall of snow.

The next old navigable canal to the southward is one which is universally allowed to correspond with the Nahr Malian, Basilides Petasios, or Fiumen Regium of the ancient geographers and historians. The Rutwan-yeh, a canal, now in use,

* There are many meanings in Freytag's dictionary corresponding to a mound or palace or keep applicable to either Ak or Akeb. The K and the A being often interchangeable (though not correctly) this latter word may be pronounced Ajech.

but with several mouths of older date, has been cut apparently for a part of its course in the bed of the Nahr Malka. A part of it, which is unused, now reaches an old village called Ibrahim-el-Khalal, beyond which the Ruthwanayen seems never to have extended. This village has some well-built houses in it, with an upper story to the rooms. The tomb of Ibrahim-el-Khalal is now in ruins. The Arabs say this village was built by a Pasha of Baghdad, for a favourite daughter, and was in existence in the beginning of the century. It is 20 miles south-west of Baghdad; 2½ miles to the east-south-eastward is another old tomb in ruins called Sheikh Samer. From Ibrahim-el-Khalal, the Nahr Malka, which is now called the Yusel-yeh, takes a direction of south-east by east with many twists, and many ruins on its banks. Following the old stream, we come to a very curious ruin called Abu Hubla, which bears south-south-west from Baghdad, distant 20 miles. Here the stream bifurcates one branch, the Yusel-yeh, going on towards Ctesophon, and the other, which is simply called El Tebe, or so, taking a more southerly course.

Abu Hubla itself consists of a mass of ruins of a very irregular shape. The highest part, which is 50 feet high, is of a dome shape, and is on the south-west side of the building. This ruin is surrounded on three sides by a rampart or wall in shape a rectangle, with openings every here and there. This is 30 feet high in places. The building inside is sited on the south-west face by the branch canal from the Nahr Malka, and it extends from that till it touches the north-east face of the rectangle. Its length is 1700 yards, and breadth 900 yards. Der, another ruin close to northward of the Nahr Malka, is something similar in shape to Abu Hubla, and is distant from the latter three miles to the north-eastward. The ramparts of Der are, if anything, higher than those of Abu Hubla, but in shape are roughly a quadrilateral of a circle. There are traces of branch canals or intrenchments round both these ruins. They have the appearance of fortified camps, something like the old ones I have seen in the north of France.

The Yusel-yeh, or Nahr Malka, flows on with very sharp bends, and giving off many high-banked irrigants, passing close to the southward of Khan-az-zad. On the northern bank of the old stream, and distant 11 miles from the Tigris and 1½ mile from the Khan, are some very extensive mounds, now called Chazellat. They cover a huge surface of ground, and from the quantity of burnt dates-wood to be seen amongst the debris in places where they have been opened for bricks, they appear to be ruins of buildings destroyed by fire.

In a light of the Nahr Malka, and 1½ mile to the eastward

of the principal Ghazelliat mound, is a Tel, or ruin, called Muncyter; this word is probably taken from the root Nutter of the verb to watch, forming its noun of place Muter, and diminutive Muncyter. This mound, though not large, is worthy of note, for it is covered in great profusion with iron slag, and cropping above the surface are remains of what appear to have been furnaces for melting iron. They are of baked clay and bricks, circular in form and varying in diameter from 5 to 10 feet. Branch canals from the Nahr Malka appear to have intruded this building.

Another mound, two miles to the southward, called Sukh-eeshy (derived from the word Sukht, a stone), has a still greater profusion of iron refuse on its surface and in its neighbourhood. Not knowing the nature of this debris, I put my prismatic compass on a small heap of it to take a ~~standard~~ bearing, and was surprised to find the needle deflected several degrees.

From Muncyter the Nahr Malka is called Hubbes Sook, and flows on with various twists in a south-easterly course to the river, close to which its banks are very high; this part of it having apparently been frequently deepened. At the distance of nine miles from the river a canal, with high banks has left the Nahr Malka, going to the eastward, having apparently joined the Tigris above Seleucia. Another, one mile to the westward of this one, also leaves with a northerly course towards the river. At the point where these emanate from the stream, their banks are very high. The Arabs call these places Shiboil, which may be a corruption of Shetek, a net, for there is literally a net-work of canals at these places, most of them only going a short distance. One of these two canals, extending close to the Tigris, might correspond with that cut by Trajan, and repaired by Julian to take their boats into the Tigris above Ctesiphon.

There are very extensive ruins all about this spot, marking the ancient site of Seleucia. After the decadence of Babylon, and the death of Alexander the Great, Seleucia was founded by Seleucus Nicator, about 300 B.C., and became the capital of Babylonia. A most interesting account is given by Gibbon of the rise and fall of Seleucia and Ctesiphon, successively the chief city of Babylonia. When the latter city became a powerful Parthian town, Seleucia declined in power. It was sacked and burned by the Generals of Marcus, A.D. 165, and never recovered the blow (Gibbon, p. 78). Trajan had previously captured Ctesiphon (A.D. 107), but it had been restored by Hadrian to the Parthians. In 198 the Emperor Septimus attempted the capture. The Emperor Valerian was taken

prisoner, and tortured to death at Ctesiphon. It was at this time that Odenatus, Prince of Palmyra, and husband of the celebrated Zenobia, attempted his rescue, but Sapora, although defeated in the field, managed to hold the city. The Roman Emperor Carus captured both Seleucia and Ctesiphon in A.D. 283, but being killed by lightning, the Romans were compelled to retire. In A.D. 363, Julian, after capturing Persabor and Monga Malka, also tried to take Ctesiphon, but failed. Persabor was a corruption of Ferroz Saboor, a city which was also called Anbar. The ruins are still known by this latter name, and are about two miles north of Felujia. Though, not in my work, I rode over to see the ruins of a town once so celebrated. Caesney supposes that a mound marked Tel Akber marks the site, but he seems to have been to the very spot, and strangely missed the name; for a mound marked Medina-Ombatra, in his Map No. 7, seems to be meant for Anbar, or to occupy about the position. The city of Monga Malka, that was afterwards taken by Julian, was 11 miles from Ctesiphon. Gibbon says, "the city or rather fortress of Monga Malka, which was defended by sixteen large towers, a deep ditch, and two strong and solid walls, appears to have been constructed at the distance of 11 miles as the safeguard of the capital of Persia." I do not know whether the position of this city or fortress has been in any way determined, but, perhaps, either the ruin now called Shaishebar or the Ghuzellat mounds might mark the site. Shaishebar, which is 11 miles from Seleucia, might mark the spot. It is a ruin of a square tower built of sun-dried bricks, in shape and appearance like Akk Kūt, only much smaller. It is on an old canal, and has very many mounds all about it, and debris of buildings cover the soil for miles. I have no idea what the meaning of the word is. I have not, I am sorry to say, a copy of Ammianus Marcellinus, but I see that Gibbon says after the capture of Monga Malka it was so destroyed that not a vestige was left to show that such a city had ever existed.

In the reign of Chosroes Nushirwan, from 531 to 579, the Parthian Empire became so powerful that Gibbon says of this king—"victorious and respected among the Princes of Asia, he gave audience in his palace of Molan or Ctesiphon to the ambassadors of the world. Their gifts or tributes, arms, rich garments, gems, slaves, or aromatics were humbly presented at the foot of his throne" (p. 696). It is the ruin of this palace which is now to be seen, and which is still called Tak Kesra, or arch of the king.

As the ruin now stands, it consists of a magnificent arch, 86 feet high from the under part of the ground, and 82 feet

broad at the foot. From this arch a vaulted room extends 153 feet to the rear. The roof of this has partially fallen in, and tradition says the place was struck by lightning in the year of the Prophet's birth. The building faces the winter sunrise, or east-south-east, from which direction it has a most imposing appearance. The front walls of the two wings are alone standing, the rooms having fallen in. In the centre of the arch are marks of thousands of bullets that, report says, were fired at a huge ring which supported the curtain of the audience-chamber. This ring had, doubtless, excited the cupidity of the Arabs during many centuries, and defied all attempts to remove it till gunpowder put a more formidable agent into the hands of its many enemies. Mr. Rich was told that this ring proved to be of gold.

Ctesephon is now the only Parthian or Sassanian ruin in this part of the world not converted by time and decay into a heap of rubbish. It was finally conquered by the Mahomedians soon after the death of the Prophet. Of the two cities of Seleucia and Ctesephon or el-Mosam there are not as many ruins as might be expected to mark their sites. Of the former, Tel Omer and Sirhan, two mounds of no great size. (The former was opened by Mr. Taylor, now Her Majesty's Consul at Erzeroum and Diarbekr.) There are also the remains of a wall which abut on the river, where it is upwards of 30 feet high. This was built of sundried bricks, and appears to have surrounded the mound of Sirhan. It continues in the same direction on the eastern bank of the Tigris, and, if we did not know that the rivers separated the two cities, as it now does their ruins, one would be apt to think that it formerly flowed to the northward of the latter city. There is a swamp near Tel Omer which has do it these swallowed up many of the ruins of Seleucia, as low mounds and ridges of bricks and lime can be traced all over it. Round about Tak Kesra are some low ruins of buildings and a few small mounds. A canal seems to have passed close to the westward of the palace, and was probably from the Nahrwan. To the westward of the palace are the ruins of a wall similar to that on the opposite side. This forms an arc of a circle, both ends abutting on the river, with ruins of buildings enclosed. A mile and a half to the east-south-eastward is another wall, called by the Arabs Sour-el-Bostan, or garden wall. It forms a right angle, with both ends on the river. There are two old tombs near Tak Kesra, one called Sulman Pak and the other Hadatha or Hadana. They are both supposed to have been contemporaries of the Prophet, the former is popularly believed to have been his barber. The Tigris, after flowing past the ruins of Mosam, continues to the

southward for about five miles, and then turns sharply to the northward for about the same distance forming a very peculiar right. Exactly in a line with the direction of the Hubl-es-Sook or Nahr Malka, and on the opposite side of this right are the traces of a canal or navigable stream, which I have previously mentioned, called Hubl-ed-Dihlehleb. There are marks in the Ctesiphon right which would show that in former years the bottom of the right was to the northward of a line drawn across, connecting the two streams. I cannot help thinking that the Hubl-ed-Dihlehleb was a continuation of the Nahr Malka. I am aware that almost all the ancient authorities (Pliny, Ammianus, and Ptolemy) agree in stating that the Nahr Malka fell into the Tigris at Seleucia, but Ptolemy, I believe, says it fell into that river some distance below Seleucia.

It would certainly have been of enormous advantage to the country to the southward of Seleucia if the waters of the Euphrates, brought down by the Nahr Malka, had been conveyed over it. It is true that this might have been done by irrigants, still leaving water enough to form a navigable canal flowing into the Tigris at Seleucia. That the Nahr Malka and Hubl-ed-Dihlehleb appear to have been one stream, a glance at the map will show.

Alul Feda says, the el Mekk was the next canal to the southward of the Sorsor. Yakuti says, it is beyond the Nahr Aessa, and watered 363 villages, and that it was dug by Solomon, the son of David, according to some, and by Alexander the Great according to others. The branch that leaves the Yusefhyeh, at Abu Hubla, again bifurcates at a place four or five miles to the south-eastward, called Kih ishm-el-Dihseh (or the Wolf's Nose). There are several smaller canals at this spot radiating in different directions, and extensive ruins lie scattered about. The stream, at this point must have been frequently deepened, as the canals have very high banks. One of the main branches passes close to the town called Shaishebar, which I have previously mentioned. From Kluchm-ed-Dihleh the other branch goes to the south, turning after 12 miles or more, gradually assuming the appearance of an irrigating canal. Close to the southward, and passing within a few hundred yards of this last stream is the bed of another old navigable one, the Arabs call this Abu Dihleh. It leaves the river 34 miles above Babel, and flows close to the northward of a ridge of pebbly formation. It is very indistinct in places, the ground lying at one time being a swamp. Numerous high banked canals seemed to have joined these two streams, taking the water of the northern into the southern one, after its own mouth had been

choked up or unused. This spot is also called Khushim-ed-Dheeb, and the old canals form a perfect network, and cross one another in such confusion that it is with the greatest difficulty that the parent stream can be traced. It winds considerably, and has ruins on its banks; indeed, were it not for the debris on its banks and the abrupt endings of the high-backed irrigation, it would, in places, be impossible to trace it.

This stream must have taken nearly all the water of the Euphrates (left by the Nahr Malka), if it was not that river itself. From the paucity of ruins on the Euphrates to the southward of the Abu Dibbis, and from the immense number on this stream, it would appear that the old Euphrates flowed to the eastward of the pebbly ridge, which extends 12 miles south-east and north-west. There is a narrow gap between this ridge and one on the opposite side of the present Euphrates, between which that river flows. A canal might have been cut through this gap, which gradually enlarged till it took the whole of the river. What would seem to make this probable, is the fact that the old stream, which flowed to the eastward of this ridge, appears to have joined the present course of the Euphrates above Babel.

The old bed of the stream I am now describing flows close to the westward of Khan Bir Eunus, goes on with many twists and ruins, passing close to the eastward of Khan Haswa, where it bifurcates. The western branch goes down towards Babel, and the eastern, called Hubl Ibrahim (Hubl—a line), passes close to the westward of the huge mound called Tel Ibrahim. This seems to correspond with the Nahr Kuthiyah of Abul Feha, which he says, left the Euphrates below the el Melek, and that it divided into two branches, one going into a swampy country, and the other entering the Tigris below the el Melek. The western branch is called by Chesney ed Dihyal, but though I asked many Arabs by what name it was known to them, they on— and all said that it was generally called el Mutn, which means a hard or raised roadway.

I may here remark that there are several names in Chesney's Map not to be met with now. Notably, the mounds of Mahmed, near which he supposes the battle of Kunuxa to have been fought (Map No. VIII.), also the mounds he calls Asnik-wa-Mashukah, 10 miles below Modain (vol. i. p. 56), names which I did not hear from the Arabs.

The Mutn, which is also called el-Rhoor, or the channel, at the spot where it leaves the Hubl-Ibrahim, goes on, with various twists or bends, towards Babel, near which it seems to rejoin the Euphrates. Four miles from the fork, and on the

western bank of the stream, are ruins, called Towaibeh. These are called the ruins of Kutha in Chesney's Map.

Towaibeh is not an uncommon name for ruins built of sun-dried bricks. The word itself is, I believe, an Arabic diminutive of the Turkish word *Tabeal*, or a fort of some kind. *Akr Kif*, *Akr-el-Gherbi*, *Shaisib*, *ba*, *Towaibeh* on the *Mutn*, and another ruin, also called *Towaibeh*, $12\frac{1}{2}$ miles to the north-west of its namesake, have all the same characteristics, and are the only ruins of the kind in the map. They have all a central solid tower of sun-dried bricks, with layers of reeds between the layers of bricks. They are surrounded by ruins of kiln-baked bricks, and lime, and bitumen. Canals or streams have passed close to them. They gave me the idea of having been watch-towers, in the centre of the towns.

Towaibeh is close to the eastward of the road between Baghdad and Hilla, and would strike the eye of any one passing. It is not quite four miles from *Klan Husa*. On the ruins to the north-westward of the tower are two round lines, which exactly have the appearance of a porch or entrance to the building.

There are very extensive but low ruins all about Towaibeh. From here to the southern limit of the map, the *Mutn* has a great number of ruins on its banks. The plain to the eastward is covered for miles with debris of glass, pottery, glazed and unglazed, in such wonderful profusion, that however accustomed to the sight of ruins, one cannot but feel astonishment. For miles a horse cannot take a step without treading on glass or glazed pottery, made with a skill that is now completely lost even to the workmen of the capital of Turkish Arabia.

The other branch of this stream flows on (the present tense is only used for brevity), on with some very large ruins on its banks, till it reaches *Tel Ibrahim*, which mound, as I have already said, is the Kutha of Mr. Rawlinson. After passing *Tel Ibrahim*, the *Habl* seems, by Lieutenant Collingwood's map, to have joined the *Shat-en-Neel*, and to have fallen into the *Shat-el-Hye*, a branch stream from the *Tigris*.

The mound of *Tel Ibrahim* is $17\frac{1}{2}$ miles to the north-eastward of *Babel*; it is by far the largest mound in this part of Mesopotamia is 1000 yards in length, and about 60 feet high. Close to the south-westward is a smaller mound, on which is a tomb, from which the two mounds and the old stream now derive their names. In places where hyenas have made holes and in places where rain has formed channels in its sides, the walls of the building are exposed. The surface is covered with more than the usual amount of debris of glass, pottery, and building material, and on one occasion, when I was riding across with

Colonel Kimball, we found vases full of debris of bones and earth. Kutla, according to Mr. Rawlinson (or Cutla as he spells it), was the city peculiarly dedicated to Nergal or Mars ('Ancient Monarchies,' vol. i, page 172). Sappura, or Sepharvann, was, according to Mr. Rawlinson, distant 20 miles by a direct route from Babylon, and near Maseyb. There are no ruins of importance on the present Euphrates in this neighbourhood, whereas the old stream, now called El Mutn, is lined with ruins. Is it not possible that Towabeh (the eastern one) might mark the ruins of Sappura or Sepharvann?

That the Euphrates north of Babylon did not flow in one stream as it now does, is not only known from the ancient writers, but, also, from modern historians and geographers, and the truth of their statement is borne out by the appearance of the country at the present day. Herodotus says, that Nitocris, Queen of Babylon, by digging channels above that city made the river so winding that in its course it touches three times at one and the same village in Assyria (Cury's Translation, p. 89). The fleet of Alexander the Great was, for a time, lost in the windings of the Euphrates. Even so late as the time of Thevenot, 200 years ago, the broad Euphrates was lost in numerous channels carried across the country. Rennell, half a century later, says the river was not navigable lower down than a place called Rousvaine (Ruthwaryeh); beyond this there were rocks dangerous for larger boats. As there are no rocks in this part of Mesopotamia, we doubtless, achieve to the bricks and debris of buildings that lined the sides of the streams. He also says that, by clearing away the stones, the Euphrates might be made navigable to the Tigris. At Rousvaine, he says, the goods were landed and carried across to Bagdad, whence they were conveyed by boat to Busrah. He also states that the Euphrates divided itself into so many channels that the pilots lost their way very frequently. There is a mixed clan, or caravan-serai, called Majlam, or Mukdam, close to the Ruthwaryeh, where boats still land lime and bitumen, brought from Hit for the Bagdad market, but such an indirect route for Busrah is not necessary now. The word Mukdam implies a place of bringing to, or making fast to the shore.

The Euphrates has, from the nature of the country, always been the river from which the great irrigating canals in this part of the country have been derived. Its bed is higher than that of the Tigris, and consequently its water has been easily led over Mesopotamia.

This accounts for the great changes that have taken place in the Euphrates even in modern times, whereas the Tigris has

apparently but slightly altered its course. At the present time it is with great difficulty that boats of any size can ascend the Euphrates at all. About 10 miles above its junction with the Tigris the river is spread over a vast surface of country, and the channel in the low season is in places only two feet deep, and not more than four yards across. This is a great inconvenience, but not an absolute impediment to boats ascending the river, as they generally take smaller boats, into which they discharge their cargo at this spot re-shipping it further on. When I descended the Euphrates, with Colonel Kennell, in the spring of 1863, our boat had frequently to be dragged through the mud, and the reeds were touching both sides, although 30 years ago the steamers of Chesney's expedition passed up and down and found from 12 to 18 feet of water at this place.

A comparatively small outlay of money would not only render the Euphrates navigable, but would, by allowing the banks to be cultivated, add immensely to the resources of the Pashah. Besides this, Busrah would become a healthy town instead of a haunt of dangerous fever. Although the country comprised in our map is in most places a barren waste, where formerly most extensive cultivation existed, yet it is not entirely uncultivated. No one who has not seen the country can have an idea of the effect that water has on the soil. The descriptions given by Herodotus of the fertility of the soil seem but little exaggerated.

The Turkish Government adopts towards the cultivators a suicidal policy. It is not so much that the taxes are heavy, but the system of bribery and peculation carried on by the officers of Government renders these taxes but a nominal part of the actual outlay. The present Pacha of Baghdad (Namik Pasha) is believed never to take a bribe, and is very severe to those against whom corruption is proved. But this is a most exceptional case, and is mentioned by Turks even with astonishment. In a country where an honest governor is a curiosity little improvement can be looked for in the condition of either the soil or the people.

Near Baghdad are large fruit gardens which line the river banks: the date-trees being the most valuable part of them. Cultivation is also carried on along the course of the river, the ground on the banks being irrigated by machines called *churds*; these are of very primitive construction. The water is drawn up in leather buckets by horses or oxen; by an ingenious contrivance these empty themselves as soon as they have arrived at the proper height: the water is thence led over the country in small channels. The fields so watered seldom extend more than

two miles from the river-bank. Wheat and barley, besides millet, sesame, castor oil, cucumbers, melons, beans, and other vegetables, are chiefly cultivated.

A system of irrigation by canals from the Euphrates still exists, although but a parody on that carried on by the ancient occupants of the soil. There are seven respectable-sized canals derived from the Euphrates in the area embraced by our map. These are generally farmed from the Government. Last year, I am given to understand, the income derived from them by the Government was as follows:—

	Kersa.
Abu Ghurab	22,500
Ruthwanayeh	1000
Mannamleh	11,070
Ishter-yeh	117
Mosul	87,446
Nasr-yeh	3,041
Muhawel	12,600

About 220 kersas equal to 100 rupees.

The amount of gain from these canals, as well as the income derived by Government, is constantly fluctuating, and depends chiefly, in the first place, on the enterprise and capital of the farmers. But their gain or loss depends upon the amount of the rise of the river as well as the contingency of a flight of locusts, which sometimes devour whole fields in a few hours.

I have seen the canals full of water in December, when much rain falls on the mountains, and a fresh comes down early. But the highest rise of the Euphrates is generally in May, and that of the Tigris in April.

The canals I have mentioned are from 7 to 15 yards broad at the mouth, and from 6 to 10 feet deep in the high season; they extend into the middle of Mesopotamia; the water is led away from them in branch canals till the main stream is all absorbed. There are many large mounds scattered about over the face of the country which I have not mentioned. A large mound called Tel Hubboos (from the word Hubboos, a prison), is 11½ miles nearly due south from Ctesiphon. Ajeshiat, 7 miles south of Hubboos, and the same distance from Tel Ibrahim; Tel Dikhbat (Hyena), close to the western point of the Hubbes-Sakhr; Te Abu Shumzer (a watery plant which camels eat) on the Habi Ibrahim and Abu Shiere (barley), both 8½ miles from Tel Ibrahim, are all large ruins. The principal mounds are nearly all on old navigable canals; some of these appear to have had this character till they reached a large ruin, and thence the water seems to have been absorbed by irrigators. It is impossible at present to judge what breadth these streams were, as the traces of them often vary, within a mile, from 20 to 80 yards

in width, but in few instances do they seem to have exceeded 100 yards.

The country is dotted all over with tombs, generally called *Imams* by the Arabs. Many of these are of quite modern date, but little respect seems to be shown for many of them by the Arabs, as the older ones are in ruins; some, indeed, are only marked by a heap of bricks and a name.

There is a rather handsome *Shi'ah* shrine on the road to the *Haj* from *Baghdad*. It is close to *Mosayb*, and is called *Awal-lul-Musloom*, or children of *Musloom*. It has two rather pretty green domes. They are supposed to cover the graves of *Ibrahim* and *Muhoined*, sons (or grandsons, according to some) of *Musloom*, who was the nephew of *Ali*, son-in-law and cousin of the Prophet. Another tomb, to the eastward, $1\frac{1}{2}$ mile, is that of *Abu-el-Jassim* or *Kassim*, who was the son of one of the *Imams*. There are many other tombs that will not repay description.

The small scale of *travelling*, on which the survey of *Mesopotamia* is being taken, precludes the possibility of great detail. It, however, sufficiently answers the purpose, and a larger scale would require a longer time. I am aware of the many imperfections of the sheet which I have completed, but still hope it may be of some small use in helping to elucidate works of valuable information, like the '*Ancient Monarchies*' (now being published) by Mr. Rawlinson. I have had no difficulties whatever to contend against in doing this part of the survey, save, perhaps, in eliciting truthful answers to simple questions from the Arabs, who are always too ready to say what they think will be agreeable.

I cannot close this paper without offering my best thanks to Colonel *Kemal*, the Political Agent of *Bagdad*, who is always ready to place his knowledge of the country at the disposition of every one.

Bagdad, 1st May, 1866.

IX. *Description of Diarbekr.* By R. J. GARDEN, Esq., F.R.G.S.

Read, April 8, 1867.

THE town of *Diarbekr* is built upon the right bank of the *Tigris*, which rises high and precipitously above the river. It is surrounded by walls defended by towers, some of which are rectangular, others semi-circular. They are of various sizes and heights. Some of these are ornamented with sculpture & designs of lions, suns, &c., in high relief; likewise with Arabic or

Cufic inscriptions, in very large characters, also in relief. Many of these inscriptions are much worn by time, but the bigotry of the natives is a sad hindrance to getting them copied. A *terre-plein* (*intervalum*) runs all round the outside of the walls; then a low wall, and a ditch beyond, where the nature of the ground allows of it. On the east, or river side, the walls are lower than elsewhere, being built upon the edge of a somewhat precipitous line of rock, the face of which has farther been scarped to increase their strength. The walls are in a much better condition in some parts than in others. In many places, however, they begin to show a very dilapidated appearance, and will in a few years either fall down or require extensive repairs. At many points repairs have already been made, which are very plainly seen, especially on the river side, where the underlying rock has crumbled away, bringing down a portion of the masonry. On the inner side these walls are in a ruinous state. That the walls and towers have been erected at different periods is apparent from the fragments of old buildings built into them at localities, and especially parts of the shafts of columns, the circular ends of which are to be seen in several places.* One semicircular tower on the north side is almost entirely constructed of these latter remains; the black volcanic stone of which these columns are made forms a strong contrast with the other and lighter coloured materials. Between the towers are smaller rectangular ones, which, besides acting as defences, served also as buttresses to strengthen the walls. Many of the towers are of great antiquity, as can be seen by the worn appearance of the outer facing of the stones of which they are built. Some of these had formerly buttresses at their bases to increase their strength; these buttresses extended five or six feet on the outer side, and sloped off to a height of from three to five feet above the ground. There were also small posterns at different points along the walls, which are now all built up. Wherever there is a precipice or sloping ground on the outside, the walls are lower than in other places where they are built upon the plain. A broad street runs all round the town between the walls and the houses. This, I presume, was a precaution adopted to facilitate the movements of bodies of troops, and prevent the occupants of the houses committing treason by undermining the walls.

* Seifeddouleh Quatremere, 'Histoire de Hassak el din,' Paris, 1806, vol. 1., p. 191 *note*, who visited it in 1199, says: "Amida lay on a mountain, three hundred feet high, on the west bank of the Tigris, and quite commanding the stream. The black walls of masonry with which it is surrounded have not their equal in the world. In fact each one of these town stones as a mill-stone would be worth fifty gold pieces. Water-towers, 'be-adas,' are three springs which give five milas." See Ritter's 'Erkunde,' Theil 2.

The gates are four in number, and are very massive. The *Dagh Kapi* is on the north, the *Rum (Roum) Kapi* on the west, the *Mardin Kapi* on the south, and the *Yeni Kapi* on the east. There was a lift, from the citadel to the river on the east side, but it is now built up. On the inside of the *Dagh Kapi* is a building, now in ruins, in the upper part of which are a number of arched and well-built windows formed of red tiles, with Coptic inscriptions on the walls between them. Externally, and on each side of the gateway, which is lower than that of the other entrances, is a small tower, and in the flanking towers two others; the latter are apparently for sentinels. In the walls on the right-hand tower are some inscriptions; amongst others a Greek one turned upside down, above which are two lions, very rudely executed, like those at *Kharput Castle*. The left tower is decorated by two sculptured buffaloes, and an eagle, all of which are in a poor style of art. Above, and on one side of the entrance, is a large stone cannon-ball; and on the other a number of iron balls, massed together like a gigantic grape-shot, and fastened to the wall. The towers and walls at the *Rum (Roum) gate*, leading to *Aleppo*, facing the westward, are very high, of great strength, and worthy of a visit. With reference to the name of this gate, we read in *Gibbon's 'Rome'* that the Ottoman monarch was termed the Sultan of *Roum*. Each tower is well furnished with long narrow loopholes. The gateway is rectangular, with a straight lintel. Immediately above this is a scroll, shaped like the segment of a circle, and, still higher, is an eagle, or hawk, standing upon the horns of the skull of a cow or buffalo, through the nasal extremity of which latter hangs a ring or wreath. This, which is carved in stone, may be emblematical. Above, but extending the whole length of the lintel, is another scroll of Arabic or Coptic. One of these inscriptions bears the date "559 of the Hegira." On the inner side of each gatepost, high up, is carved a hand supporting a wreath or ring. The outer gate is made entirely of iron, without any woodwork, and is formed of horizontal and perpendicular bars rivetted to thick plates with large-headed bolts. The intervals between the bars are ornamented with various devices in the same metal, similarly fastened to the plates. The bars, as well as the padlocks for securing the gate when shut, are massive, but very primitive in their construction. Side chambers, or recesses inside the gateway, exist for the accommodation of the gate-keepers. The roof of the gateway is arched, and built of narrow red tiles, and is much higher than those of the others. The inner gate is of wood, strengthened with iron bars. Above the gateway are the remains of some dome-shaped chambers built of red tiles, arranged in an orna-

mental style, but now in a ruinous state. The battlements on the top of the wall are only 2 feet thick; the walls are about 14 feet, although at some points they are less. Through the kindness of Mr. Holmes, the British consul, I am enabled to give the following measurements.—Height of the towers of the Rum Roun) gate, 65 feet 6 inches; height of the wall between the towers, 52 feet, height of the wall adjoining the towers, 44 feet; breadth of the terre-plein, 19 feet. The towers are large and roomy, and have three stages or stories, the loopholes of which, generally 5 in number, are arched over on the inside with red tiles, and resemble small casemates. The defence of the walls of the town was effected on the land side by two or more loopholes, passages, or stories, built within the thickness of the walls, and extending from tower to tower. Access to these, as well as to the upper battlements, was maintained by flights of stone steps. The banquette running round the summit of the walls was, like that in the citadel of Ezerum, totally devoid of parapet towards the interior of the place, an extraordinary and unaccountable omission.

Between the Rum (Roun) and Mardin gates, the walls take a sweep inwards in the form of a crescent, to clear a ravine, which extends some way up towards them. The Mardin gate is differently built, there being but one immediate flanking tower to the eastward. The entrance, however, is shielded from outward view by a high and strongly built wall, beyond which the ground slopes off precipitously towards the river. The Yem Kapi or new gate, was protected by a projecting flanking tower and a wall built along the edge of a precipice, the defences on this side had formerly been further strengthened by an outer gateway and tower, now in ruins. The descent to the river is zigzag, and very steep. The gates are locked every night at sunset, and the keys are taken to the Seray, so that after that hour no traveler can obtain admission until leave has been obtained through his consul from the Pacha.

The view of the town from the top of the Rum (Roun) gate is very good. Numerous mosques are distinctly seen, and the extent of the place is clearly ascertainable. Several ancient but ruined buildings are visible, one having the appearance of a church or monastery, with a portico, is very conspicuous. The mosques are built of different coloured stones in layers; some also are constructed of these materials, but varied with layers of tiles. Water is brought from a long distance to the westward by means of a watercourse covered in, and built of hewn stones cemented together. On nearing the town it flows along an aqueduct about 34 to 4 feet wide, built of black volcanic stone, and raised on 27 rectangular piers, and as many semicircular arches, by which it is carried through the walls

Inscription on a tower near the Marlin gate, going towards the Rum (Roum) gate:—

"In the name of the gracious and merciful God, who is Almighty.

"By order of our Lord the Sultan, the master Sultān, wise, just, protector, warrior, conqueror, for player of justice, Nāssir-ed-dunya ve-ddin, the sultān of the empire, the monarch of the East, the light of the country, the glory of kings, and sultan of the world, the sultan of Diarbekr, of Rum (Roum) and Armenia, the heaven of heavens, the hero of the world, the king of Hamach in Iran, the sultan over of which had been notified by Kalabek, Abū-l-ḥayr Mahmūd, son of Sultān (Sultan?), son of Iḥsān, prince of the faithful; this tower was erected by Behān, son of Iḥsān and Sultān, according to the plan which the king made himself applied."*

These inscriptions belong to Salch Mahmūd, a prince of the dynasty of the Ortokides of Khayfa. This town was called Hesa Khayfa, and known in the time of the Romans by the name of *Castrum Cephe*.

All these inscriptions were in the Arabic character, but the man who copied them could not exactly explain to what particular towers they belonged.

The citadel is placed at the north-east angle, and has two gates communicating with the town. In it is situated the Saray, a low, common-looking building, in a dilapidated state, in the court-yards of which are two large plane-trees. On each side of the gateway of the Saray are the figures of animals sculptured in relief. Immediately opposite the Saray is a great mound, on which the *Sahlebs* or *Sahibs*, the former Mohammedan princes of the country, had their castle, but of which nothing remains but the foundation walls†.

Adjoining the Saray is a high rectangular tower, built of black volcanic stone, to which is attached a small mosque. This tower it is supposed was formerly the belfry of a Christian church. Both outside and inside the courtyard of the mosque are the tombs of several former pashas, as well as of members of their families. The pivot-shaft of the staircase of the tower is rectangular, the ascent being arranged in divisions of three steps, with a landing-place, and so on. The view from the summit of the belfry embraces the whole town.

On the monumental inscriptions, they also caused public prayers to be offered up in honour of them. This is the reason why the name of Nāssir-ed-dunya ve-ddin is mentioned here.

* The Agabete princes took the title of King of Rum (Roum) and Armenia. Here again occurs the name of Nāssir-ed-dunya ve-ddin king of Damascus, whose supremacy Salch Mahmūd acknowledged. Hamach is the name which the province of Azerbaijan bore formerly. It would appear that at this period the governor of Azerbaijan, by name Kalabek, must have made his submission.

The man who copied the above inscriptions could read the Coptic character, although he spoke down some in Arabic only, and having left Diarbekr the day he gave them to Mr. Maltan, he could not be sent out again to get some Coptic ones.

† See Ritter's *Edessa*; Theil xi, 1844.

There are about fifty-seven mosques and jamis (mosques) in the town. A mosque has a minare, whereas a masjid has none. Mr. Maltass and myself visited the Ulu-jami, or Great Mosque, which they say was originally a Christian church.* It has a sloping roof covered with sheets of lead, and on each side of the centre building is a wing, thus forming three separate mosques for three of the four sects of Mohammedans, the names of which I was informed are Hamiti, Schafe, Maleki, and Hambeli. In the front is a large quadrangle, which is entered from the eastward by an archway, above which are carved figures of lions destroying other animals, but rudely executed. At the inner and opposite extremities of this quadrangle, eastward and westward, is a façade, consisting of a couple row of columns, one above the other, and ten in number. The capitals of the lower columns are Corinthian, those of the upper are what I should call Saracenic, possibly Byzantine, but handsomely ornamented. Each section of the shafts of the lower columns is of a different coloured marble. Some of these columns, which are quite plain, have two sections, others three. The shafts of the upper rows of columns appear to be formed of single blocks; and, although not so high as the lower ones, are each ornamented with traceries of a different pattern carved in high relief. Above the capitals of the lower row of columns at the eastern extremity is a border, consisting of bunches of grapes and vine-leaves. The traceries on the walls between the columns have the appearance of being Saracenic or perhaps Byzantine. Arabic or Coptic inscriptions are introduced at different points. In the quadrangle are two *Shadirwāns*, built of wood, with conical roofs, covered with sheets of lead †. At the north-west corner is a small masjid for the use of the fourth sect (Hambeli) of Mohammedans, although they say that at present there are only three sects here. Eastward of, but close to, the Great Mosque is a large building called the Hassan Pasha khau or caravansaray. It is constructed of layers of white and black stone, which have a good effect.

We next went to the Chaldean church, the bishop of which is a man of education, and speaks Italian. We went into the

* Texier remarks, p. 21, part 3, of his work on Armenia, Persia, and Mesopotamia, that "One of the most curious monuments at Diarbekr Anada is the ancient palace which is merged, it is said, in the mosque but which, under Il occupied. This monument consists of two parallel façades, and of a vast edifice in front, which has been converted into a mosque. It is to this religious destination that the astonishing preservation of the edifice ought to be attributed. Each of the façades is adorned with two stories of columns of grey and costly marbles, and the sculpture denoted the workmanship of the third and fourth centuries. However, all the details of the lower story, *retrouvent* an air antique, which proves that this kind of construction is more ancient than is believed to be."

† *Shadirwān* is a building, where the faithful wash before entering the mosque.

church, which was like an Armenian *flâne*, only somewhat cleaner. On the walls hung several pictures, but were almost indistinguishable from want of light. A priest, who spoke French, said that they had a library in the bishop's house, which contained some old manuscript books. Thence we went to an Armenian chapel, called *Sarp Gregorio* (Saint Gregory). It was formerly called the *Kuchuk K'issè*, or Little Church; but having been burnt down about forty years ago, it had been rebuilt on a somewhat larger scale. The walls and pillars supporting the roof were of black volcanic stone. At the time of the fire a number of old manuscripts were also consumed.

As I heard that a wedding was about to take place, I waited to see it. During the ceremony I was accommodated with a seat in an arm-chair inside the altar rails. When the couple appeared at the door, they were kept standing outside, the bridegroom holding the left hand of the bride in his right. He was supported by a male friend, and she by two women, both of whom were desperately plain, and whose duty appeared to be to hold her up—a most necessary proceeding, as she wore on her head a pasteboard cap shaped like an hourglass, over which was thrown a long pink scarf reaching to her feet, and ornamented with tinsel, &c. A *kerechief* was tied round her forehead and over her eyes. After being kept some time at the porch by a priest, they were allowed to enter, when the two males were each presented with a long rose-coloured gown, which they put on. Here, again, they were delayed some time by a priest, who repeated several prayers, whilst two or three boys inside were distributing short tallow dips to any who would hold them. A lane being formed, a boy commenced beating a metal tambourine. One of the priests—a jolly, though dirty-looking man, with a pair of torn blue shalwars or trowsers and bare feet—took his station on one side and commenced a prayer, to which the tambourine-beater made responses in a screaming voice, and evidently to the full extent of his lungs, varying the noise every now and then by beating and shaking the metal tambourine. In this way the couple advanced at a very slow pace, halting occasionally to allow the priest and his coadjutor to get through their parts, until they reached the altar. Here they were placed in their proper position; the man holding the girl's right hand in his, and their heads bent forward, so that the edge of the pasteboard hourglass-like adornment, upon the head of the bride, touched the forehead of the bridegroom. The priest then bound another *kerechief* over the eyes of the bride, tying it behind. Having arranged this to his satisfaction, he laid between the two heads a crucifix, which he gave to the bridegroom's friend to hold. Whilst this was going on the tam-

boursine-beater took his station on the raised platform of the altar, screaming out some oration at the top of his voice; after which the officiating priest, sitting himself in a long purple gown, and adorning his head with a gilt crown, surmounted by a Maltese cross, took his place in front of the altar, and read some prayers at a railroad pace out of a book. He was succeeded by a very respectable, clean-looking old man, with a white beard whom I had noticed on first entering the church. This personage was attired in a long, dark-coloured cloak, with a hood, which he drew over his head. He then read for a few minutes out of a book held for him by an attendant, after which the ceremony was concluded by the couple moving out of the church at the same slow pace as they did on entering, having every few paces to enable the priests to mutter some prayers. I saw the bridegroom, on first taking his station, put something (doubtless the nuptial ring) on the finger of the bride. He got remarkably pale towards the end of the ceremony, from standing so long in an unpleasant position; and no doubt the bride felt equally uncomfortable. A number of spectators were in the church, and, to show how little respect they had for the place, one woman was knitting stockings.

The parties who were thus married belonged to the poorer class.

The red stratum overlying the rocky substratum, on which Diarbekr was originally built, now lies about 10 feet beneath the present surface of the ground; so that, to discover any relics of antiquity, it would be necessary to excavate below that depth. The reason of this increase of soil is, that when a house fell or was destroyed, another was built upon its ruins. Some workmen engaged in digging a tank in the garden of the Consulate discovered four walls of stone built in the form of a square; they also found some fragments of a mosaic pavement formed of pieces of different rocks in the neighbourhood and arranged in a bed of cement. These fragments were lying on their sides, thereby showing that the mosaic-work had been disturbed and destroyed at some former period.

The Mohammedans of Diarbekr are considered to be the most fanatical in the country, but it was extraordinary what the presence of our Consul, even during the short space of two years, had effected.* Previously to his arrival European women did not dare to show themselves in the streets, but were compelled to be muffled up in the native manner, and although even now the ladies wear their veils, they are able to appear in bonnets.

* My visit to Diarbekr was in 1856-7

With the exception of an occasional visit to the American Missionaries, the ladies of the Consul's family could take no exercise except on horseback, which they generally did when the weather permitted. The appearance on horseback of European ladies occasioned no small curiosity and astonishment among the native women, who had never seen females riding on side-saddles. It was imagined that our Western women had only one leg, the fair equestrians in Turkey being accustomed to ride astride like men. "Come along," one woman was heard to say to another, "and see a lady with only one leg riding on horseback."

One day the Consul's *dragoman* brought his daughter dressed up for us to see. On her head she wore a *fess* or *hiz*, the tassels of which, instead of hanging down loosely, were spread out and sewn down to the front of her cap. On the flat part were sewn three rows of small gold *beahliks* (five-piastre pieces). Round her forehead was tied a coloured kerchief, and over this a *bandeau* with ear-lappets. The *bandeau* was composed of pearls with a centre ornament of pearls, emeralds, and rubies, and, attached to the bottom of it, were loops of small pearls and pendants of emeralds and rubies. Some stones of the latter were also mounted and set in amongst the pearls forming the *bandeau*. The ear-lappets were of pearls with a centre ornament of emeralds and rubies, and edged all round with small gold coins. The strings which fastened the *bandeau* of pearls behind the head hung down in front on each side of the bosom, and were also ornamented with small gold *beahliks*. Her dress consisted of a pair of *shalwars* (Fatima trousers), a high *chemisette* of muslin embroidered with sprays of red and green floss-silk, over which was a pelisse of blue flax-satin with long, full, hanging sleeves. The pelisse was edged with gold lace and corn, and cut away in front so as to show the swelling of the bosom and the muslin *chemisette*, and reaching down to the heels quite concealing the trousers. Round the waist was a red silk net sash. Over her shoulders she wore a short jacket of cloth embroidered with gold-thread. Round her neck and hanging down in front were three chains, two of which were of unequal lengths, and were composed of gold coins of different value, both in and out of present circulation. The third chain was the longest, and was made of festoons of pearls and small gold ornaments of open work, manufactured at Diarbekr, to which were attached three charms. The central one, which hung down below her middle, consisted of a large piece of cornelian or agate enclosed in an ornamental gold case mounted with rubies and emeralds. The other two were of embossed gold. She wore coloured worsted or woollen socks of native manu-

facture. She had left her slippers outside the door. Over her head and shoulders she wore a light-blue net veil spangled with gold leaf and bordered with a fringe of gold-thread, which was rather weighty. This veil hung down and covered her body. She said the *bandeau* on her head was heavy and made it ache. Her father valued her dress at 15,000 piastres, *beyaz para* (white money), which, at 110 piastres to the £1 sterling, British currency, would amount to about £133*l.* 13*s.* 1*d.*

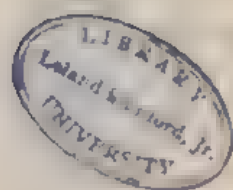
Diarbekr is one of the stations of the American mission. I found three gentlemen of that admirable institution located here, all of whom were married. The members of the church amounted to 39, the general congregation to between 200 and 300. Of these about 60 were women. The school was attended by some 50 boys and girls. These are kept separate. Two native teachers assisted the missionaries. Upon one occasion that I attended their religious services the congregation was very numerous, there being nearly 400 persons present. Several women could read and a few write, and more were learning. Altogether the prospects of success in the missionary field at Diarbekr were very encouraging.

The American missionaries have been sent to the native Christians, and not to the Mohammedans. They have been enjoined—and it is their policy, as well as safety—not to meddle with the latter.

About the month of May, when the heat commences, the rich inhabitants of Diarbekr leave the town and repair to their *kiosks* or country residences. Their mode of rural life consists in rising very early, when all business and out-door exercises are gone through between the hours of 4 and 9 o'clock A.M. The rest of the day is occupied in reading, writing, or transacting such business as can be carried on within doors, bathing, sleeping, &c. July and August are the most oppressively hot months of the year.

The productions of the *pashalik* of Diarbekr, consist of corn, wax, *sesama*-seed, cotton, silk, wool, goat's-hair or *tiftik*, gum tragacanth, &c. The *sesama*-seed is not extensively cultivated here, as it is said that not more than one crop in twenty can be relied upon. It is grown extensively lower down on the borders of the desert, and is greatly used, having no smell, for cooking purposes and lamps instead of fish-oil. The people eat it, and even make sweetmeats with the residue, called *halwa*, which is mixed with honey, &c.

In the vicinity of Diarbekr, on the plains, there are wild pigs, larks, foxes, wolves, jackals, martin-cats, ducks, teal, widgeon, three kinds of partridges (grey, red-legged, and another sort with yellow legs), snipes, woodcocks, sandpipers, and large and



[illegible]

small bustards. In the mountains bears, several sorts of deer, the ibex, and wild goat. The sport therefore is very good and varied, as the above will show. I went out three times with the Consul, Mr. Holmes, and saw enough to convince me that those who are fond of sport will find plenty of it in this neighbourhood.

The great curse of all these Oriental towns is the filth of the streets. This disgusting feature demonstrates the apathy and indifference of the authorities to the sanitary condition of the town. In some places within the walls the stench arising from deposits of filth is abominable. A traveller would imagine that cleanliness did not form part of the Mohammedan creed, whereas particular stress is laid upon the injunctions with regard to observance of purity and decorum.

X. — *On Dr. Livingstone's last Journey, and the probable Ultimate Sources of the Nile.* By ALEX. GEO. FINDLAY, F.R.G.S.

Read, June 3, 1867.

THE object of these remarks will be to demonstrate, as far as it is possible to do so inferentially, that Dr. Livingstone has reached, or was about to enter, the southern limits of the basin of the Nile when the last painful news of him was forwarded from Africa.

I wish to premise that this conclusion is the result of a long-standing conviction that Lake Tanganyika would some day prove to be the southern reservoir of the Nile. I arrived at this when I was very much engaged with Captains Burton and Speke, in 1859, in discussing and calculating the very copious and most excellent data brought home by their nobly completed expedition of 1853-5. This first East African expedition has had scant justice done to it of late, seeing that it was the first harvest, and that by much the most abundant one, of those brilliant discoveries in Eastern Africa so eminently fostered by the Royal Geographical Society.

No apology is needed for introducing this topic at the present moment, or for considering the last journey of Dr. Livingstone, our noble explorer, to whom so many of us are united by the ties of friendship. The first despatch from the interior, which we had been anxiously awaiting, would, I believed, have definitively settled the question I am about to propose.

The points I wish to insist on are these:—

1. That Dr. Livingstone has determined that the Tanganyika Lake has no connexion with the Nyassa Lake.
2. That all known testimony makes the river run *into* the south end of the Tanganyika Lake;
3. That it *must* have an outlet, and that is probably to the north.
4. That the observations of Sir Samuel Baker, as compared with those of Captain Speke, make the Albert Nyanza on the same level with the Tanganyika Lake; and further, that the two lakes join each other;
5. Therefore, the streams which flow north-westward from the mountains at the head of the Nyanza Lake contain the true sources of the Nile.

The following notes will refer exclusively to the physical geography of the region; and in the first place I would advance, as an axiom, that the accounts given by older authors should be judged by the light of recent and positive knowledge, and not be arranged according to the imperfect reports of incompetent travellers, or the vague ideas gained from native report.

Captain R. F. Burton, who should claim the discovery of the Tanganyika Lake, has argued against his first decision, and gives many reasons now for making the lake flow to the northward (see 'Journal Royal Geographical Society,' vol. xxxv., 1865, pp. 1-15). What follows will be supplementary to that, and based chiefly on facts more recently acquired.

I trust that the subject will be made intelligible to the reader by the aid of the diagrams appended to this, which are placed in juxtaposition, and show the different views which have been formed.

To commence with the southernmost portion of our subject, Lake Nyassa, as is well known, was first seen by Dr. Livingstone September 16th, 1853.* He had followed up the important River Shire to its outlet from the lake. It was afterwards visited by the unfortunate Dr. Roscher, who reached it from Kilwa on November 18th,† two months after Dr. Livingstone had visited it. Dr. Roscher was murdered a short distance from the east shore of the lake in about lat. 12° 40' S.

The lake is very deep, possibly much exceeding 116 fathoms, and has the deep blue or indigo tint of the Indian Ocean—a

* Dr. Livingstone, 'The Zambesi and its Tributaries,' p. 125.

† Despatch from Lieutenant-Colonel. Highy, July 15, 1866.

sufficient proof of its great depth.* The eastern shore has not been seen, but it is known to be limited on that side by lofty mountains. On the west the beautiful tree-covered heights, probably 1000 to 5000 feet high, are the edges of table-lands, through which flow five rivers, the only affluents on this side. These, with what others enter it from the east and north, will be sufficient to account for the annual rise of the lake (about 3 feet) in January and for the flow of the Shazé.

The northern end of the lake is of the greatest interest in relation to the question now under consideration. It was visited, as is well known, by Dr. Livingstone's expedition a second time in October, 1861. Dr. Livingstone and his party landed near its north-east extreme in lat. $11^{\circ} 32'$, leaving Dr. Kirk and Charles Livingstone in their boat.† The land party struck inland on approaching the foot of the mountains, which rise abruptly from the lake. They encountered a body of the dreaded Mazutu, the effects of whose terrible warfare on the natives had been before observed. The boat party got separated from them for four days and reached about lat. $11^{\circ} 20' \text{ N.}$, and saw about 20 miles still farther north, or to about lat. 11° S.

The published narrative, and still more the conversations, of Dr. Livingstone and Dr. Kirk lead to the incontrovertible conclusion, that no river of considerable magnitude ENTERS the north end of the Nyassa Lake. From the height of at least 1000 feet, over which the land party toiled, the dark mountain masses on both sides of the lake were seen closing in. At this elevation the view extended at least as far as that from the boats; and it was believed the end of the lake lies on the southern borders of 10° , or the northern limits of $11^{\circ} \text{ S. lat.}$ Native testimony, also, whatever weight that may have, confirms this view.

* Mankambini (the name of the place where Dr. Livingstone landed, within 45 miles of the presumed head of the lake) had never heard of any large river in the north, and even denied its existence altogether, giving us, at the same time, the names of the different hunting places round the head of the lake and the number of days required to reach the coast opposite each place, which corresponded, as nearly as we could judge, with the distances at which we have placed its end. †

All other native testimony, too, tends in the same direction. Every native questioned by Drs. Livingstone and Kirk assured them that no large stream entered the lake, but that two small rivers alone enter the lake from the north. Dr. Kirk says that

* 'The Zambesi and its Tributaries,' pp. 369-371.

† Ibid., p. 38.

‡ Ibid., p. 390.

one of them was named Rovu, meaning "river," and the other an all river coming in from a marsh.*

The settlement of this point in the physical geography of East Africa carries with it the conclusion as to the water-parting of the whole of the river systems between the Zambesi and the Nile. For, should any river fall into the north end of Lake Nyassa, it must be a very large one: draining, as it must do, an area of at least 300,000 square British miles, or a country as large as England and France combined.

Dr. Livingstone's first journeys to the Nyassa Lake, therefore, did all but conclusively determine that Lake Tanganyika has no outlet to the southward.

It has been frequently argued, and especially by Captain Spike, that the Tanganyika Lake drained into the Nyassa. Their relative levels, as far as is known, would admit of such a theory. Dr. Kirk's careful and satisfactory observations, in August to October, 1860, make Lake Nyassa to be 1522 feet above the sea: a much lower elevation than that previously assigned to it, and at least 300 feet, and possibly 1500 feet, below Tanganyika Lake†.

Now, as Dr. Livingstone's journey had, for one of its primary objects, the determination of this important point, it may be inferred that his last journey confirmed his previous convictions. We know that he had crossed a marsh, which was found to stretch farther north than he had previously seen, and then continued his journey westward. If this marsh had been traversed by the course of a large river, such as the requirements of the case lead to the certain inference, he would have followed up this important border to the northward, and traced its connexion, if any, with the northern lake, or till its character was really determined.‡

Therefore, I hold it to be a point now settled beyond controversy, that Dr. Livingstone has determined that Lake Nyassa and Lake Tanganyika have no connexion with each other; and by that decision has also determined, in a great measure, where we are to look for the true sources of that still mysterious Nile; for it will be shown that there are all but insuperable diffi-

* See Dr. Kirk in 'Proceedings,' 1864, vol. vii p. 261.

† See 'Journal,' 1865, vol. xxv pp. 158, 160.

‡ The expedition commanded by Mr. Young determined that Dr. Livingstone passed round the south end of Lake Nyassa, instead of to the north of it, as was supposed by Dr. Kirk, and as was fully expected he would do, in order to settle finally this important point. This does not affect the problem here proposed. Dr. Livingstone either obtained further knowledge of the north end of the lake on his last journey, or he was so fully convinced, on his previous explorations, that it had no connexion with Tanganyika Lake, that he considered the point as beyond question.

culties in accounting for the drainage of Lake Tanganyika to the Atlantic, through the Congo, on the one hand, or to the Indian Ocean, by the Zinjé or other river, on the other.

Besides this satisfactory evidence of the non-connexion of the Tanganyika with the Nyassa Lake, there is another, quoted by Captain Barton, which may here be repeated. Dr. Kirk says, 'Among the few natural specimens preserved by Captain Barton was a small collection of shells from Tanganyika. Dr. Kirk brought some from Nyassa. Between them there is no community of species, while both contain many new forms. Among those from Nyassa is one of a type for the first time observed in Africa, and, being large and handsome, it could not easily have been overlooked were it present in Tanganyika. On the other hand, Captain Barton's collection possesses one species common on the Nile, and unknown on the Nyassa.'* In the paucity of our knowledge of the lake regions every fact is important towards forming a conclusion, and this one must be added to the other evidence of the non-connexion of the two lakes.

We assume, then, that if it is argued we have no *direct* evidence that this fact is positively determined, that every weight of argument is in favour of such a conclusion.

The second point in our subject is the direction of the streams running south of the Tanganyika lake.

The distance from the north end of Lake Nyassa to the reported southern part of Lake Tanganyika is about 340 or 350 miles, and the direction is N. 55° W. Of the country immediately intervening we know nothing but from very imperfect native report. About the mountainous country further west we have more information, several important routes having traversed it.

First, from Dr. Livingstone. After having explored the western shore of Lake Nyassa, he started from about its centre in September, 1853, for the west, a period of the year too late to accomplish any great exploration. But he succeeded in determining one very important point, the position of the water-parting of the rivers flowing into Nyassa, and those flowing westward. At his farthest point at Chumungu in lat. 12° 45' S., and at 85 miles in direct distance from the lake, he reached the summit of the dividing range; granitic masses lay around it, and in the north appeared a heap of blue mountains.† The elevation is not mentioned, but it must have been considerable, for the piercing winds had an extraordinary effect on his followers, one of whom died from the effect of the air.

* See 'Journal,' vol. xxiv. pp. 2-9.

† 'The Zambesi and its Tributaries,' pp. 316, 3-8.

In their progress westward they heard a good deal from the travelled Babasi and Arubis, who knew the country well, of a small lake called *Benba*.

"As we proceeded west, we passed over the source not only of the *Luanwa* (of the *Munro* River), into the Zambezi, but of another stream called *Munawa* or *Munwa*, which was represented to be the main feeder of Lake *Benba*. This would be of little importance, but for the fact that the considerable river *Luanwa*, or *Louanwa*, is said to flow out of *Benba* to the westward, and then to descend into another and much larger lake, named *Munwa* or *Munwa*. From this lake, called *Benba*, the *Luanwa* forms Lake *Munwa*, or *Munwa*; and after this it comes to pass the town of *Uganda*, bend to the north, and enter Lake *Tanganyika*."

It is very much to be regretted that this important point was not further examined. The approach of the rainy season and the result of the expedition caused it to be abandoned, and a hasty return to the Lake *Nyassa*, and thence to Europe, has closed it as an interesting topic for the present.

Beyond the point attained by Dr. Livingstone no recent traveler has penetrated, but further to the westward several expeditions have passed from the Portuguese settlements on the Zambezi to within a very few miles of the probable southern end of the *Tanganyika* Lake. The chief of these are cited, not as novelties, for they have been often quoted, but because the present moment invites them with a stronger interest.

A Portuguese colonist from Goa, *Gualtero Gualtero Pereira*,* had sent from Tette more than one trading mission to the *Cazembe* prior to 1786, and in that year sent his son, *Manoel Pereira*, in charge of a mission to the same potentate. The accounts given by these enterprising men, as related by Dr. de Lacerda in his preliminary notes to the account of his expedition, contain many geographical features of importance to our present subject.

Manoel Gualtero Pereira, the son, started in May, 1786, with his own slaves and the *Munzas* who had brought down the *Cazembe's* ivory the year before; and after traversing the land of the *Maravi*—a term by which the great lake (*Nyassa*) was then known to geographers—was forty-five days in reaching the *Arungu* River, the stream whose head-waters were found by Dr. Livingstone in September, 1863, and then called the *Luanwa* or *Zumbo*, the latter name from the place where it falls into the Zambezi 220 miles above Tette. In twenty days more he struck another river, called *Zambeze*, of which Dr.

* Related in the introduction to Dr. de Lacerda's Narrative, published in the '*Anales Maritimos*' (London, 1841, &c.). I have availed myself of a MS. translation, by Captain Burton, of this important work, now invested with a peculiar interest.

Lacerda says, "From the information of the people I venture to say that it is not our Zambeze, or any of its influents from the Xire (Shire) river upwards. The Zambeze of the Murzas flows to the *right* hand of those crossing it from Tete, and falls into other streams;" but he makes some confusion afterwards in the lakes into which it runs. "Manoel's party travelled thirty days from the river to the King's capital, crossed some deserts, and spent a day forming a lake waist deep. This body of water is drained by two channels, one to the Zambeze, the other to the Murusura River, which passes the royal residence." What follows is almost unintelligible, at least with our present knowledge, but it is directly confirmatory of what Dr. Livingstone has heard so recently.

In the further expedition to the father of the Cazembe chief, Muata-Ia-Novo, to the north-west, the route appears to cross some of the affluents of the Luapula River, which it could be demonstrated, as far as our imperfect knowledge goes, flows to the north-east and east.

By much the most important geographical exploration of this country, next to that of Dr. Livingstone, was that made by order of the Portuguese Government in 1798-9, under Dr. F. J. M. de Lacerda e Almeida, who was no ordinary man. He was a Brazilian by birth, but graduated at Coimbra, where he became a Doctor of Mathematics. He was appointed astronomer to the King of Portugal, and left Lisbon in January, 1799, to lay down the frontier line of the great South American colony. He returned to Lisbon in 1799, and afterwards went to Africa, by royal command, on a mission to the Cazembe.

The important mission of Dr. de Lacerda left Tete for the country of the Cazembe on July 3, 1798. The object of this costly and noble undertaking was, as he tells us, to ascertain if Central Africa contains any mountain capable of sending forth the Cuene River, which falls into the Atlantic a little below Cabo Negro, and to find a short and easy communication overland from Portugal to the Rios de Sena, and especially to seek the means of bringing these infidels into the bosom of the Church. In the instructions which he issued to his officers, to be followed in case of his own death, he makes especial mention of the 'Zambeze,' reported by the Portuguese, and directs that if it should flow to the right (that is, *eastward*), they would do well to ascend it to ascertain whether it falls into the Shire, but if to the left or westward, it may be the Cuene, a river which Dr. de Lacerda had endeavoured, unsuccessfully, to explore in 1798, and then it is to be followed down to its mouth, and thence find their way to Benguella. The same method of

information, that the rivers (which Gamitto says first flow to the west) ultimately join that running northward past the Cazembe's city—the Luapala or Guapala River.

When this is connected with what is related by Dr. Livingstone, of the streams flowing westward from what is probably the westernmost spur of the great Maxingri Mountains, and which is further confirmed by the undeviating testimony obtained further north, it seems that it would be a perfectly fair inference to state that Dr. Livingstone had seen and crossed the head-waters of one or other of the streams which flow toward the Cazembe country.

The position of the crossing of this northern Zambeze by Dr. de Lucinda is well ascertained, for on September 21st, 1798, eleven days afterwards, he observed an immersion of Jupiter's first satellite, which gave him the longitude of $30^{\circ} 1' 45''$ E., this was in lat. $10^{\circ} 20' 35''$, and was his last astronomical observation. The place he calls Mouro Achuto, which Gamitto says was the name of the village chief. When Monteiro was here October 15, 1831, it was called by the name Messim Chirubá.*

Dr. de Lucinda's further journey to the Cazembe's capital is a narrative of his personal sufferings. He passed near to a great lake on his left hand (westward), which has been called Chama; but this was the name of the district—it is also called the Sana Lake; and reached Lucinda October 3, 1798, worn out with fever and anxiety. Thus died this most excellent man and accomplished traveller. Had his life been spared, we should most probably have had a much more perfect knowledge of the physical geography of this important region. His followers returned to Fette under the guidance of the chaplain.

The next travellers in this region who give any clear account of the country are Major José Manuel Correa Monteiro, as related by his companion Major A. C. A. Gamitto, who went on a mission to the capital of the Cazembe—Lunda or Lucinda, in 1831 2.† Major Gamitto's itinerary is little more than a recital of the rivers and hills they crossed; but few other geographical details are found. This undertaking was set on foot from a similar cause to that of Dr. Lucinda. Towards the close of 1830 a caraván of Cazembes arrived at Fette with ivory for sale.‡ This led the governor of Sena to appoint the above-named others on

* 'O Munda Cazembe,' p. 196.

† 'O Munda Cazembe e os povos, &c. da Africa Austral,' Diaria da Expedição Portuguesa, communicada pelo Major Monteiro, e recitada pelo Major A. C. P. Gamitto. Lisboa, 1834.

‡ 'O Munda Cazembe,' p. xviii.

this embassy. They started June 1, 1831, and followed the same general line of march described by Dr. de Lacerda.

On September 12th they crossed the Serra Muxunga,* called by Dr. de Lacerda Muchinga, and named by him the Castelhara Antonina. No estimate is given of its height; but it must be exceedingly lofty, for on the second day of their ascent they marched a league, continually ascending to the ridge of the mountain, where the pass was obstructed by an immense rock, like a portal to the defile. The direct route lay through a natural aperture, 2½ feet in diameter, in this rock, or else around it, over a terrible and dangerous precipice. Thus passed, they came upon a difficult and elevated desert country, where they suffered much from hunger.

On their return they reached the Serra Muxunga on August 10, 1832, and gave a longer account of it. It stands as it were alone rising at once abruptly and very steeply from the table-land, but traverses an immense extent of country. It was estimated to reach an elevation above the sea of a league (Portuguese, or about 19,700 feet). Its head was nearly always enveloped in clouds, but no sign of snow or ice was visible or reported. The height, probably, is exaggerated, but Gamitto says that it is by much the most lofty summit in this part of Africa, and has precipices of a prodigious height. It commands the most extensive prospects to the northward.†

On October 9th they reached the River Cambezi, called by the natives Cone, a very rapid stream running to the west, but where afterwards no one knew, but Monteiro thought it might reach the Zambeze‡. There is nothing, then, in their diary that militates against the results of the much more useful inquiries made by Dr. de Lacerda.

Without following our travellers further, or further alluding to the great lakes they passed, or that of Moio near to the Cazembe capital, it may be asserted as a general conclusion, from their evidence, that the streams from the north-west of the Lake Nyassa, and northward of the mountainous desert which skirts the Serra Muxunga, run towards the lakes at the Lunda capital, and then as far as report says, to the north-eastward§.

To these testimonies we must add the more important one of Dr. Livingstone. As before noted he had taken great pains to ascertain from the travelled Hottentots and Arabs as much as possible about the country in front.

* O Monte Cazembe, pp. 170-172.

† *Ibid.*, p. 407.

‡ *Ibid.*, p. 447.

§ See 'Proceedings,' 1854, vol. vi. p. 202. Dr. Kirk confirms this—that the Loupana down north runs a small lake.

"There could be no doubt that our informant had been in the country beyond the *Lualaba's*. The *Lualaba* is said to flow into the *Luapula*, and when, at the first of testing the accuracy of the traveller, it was ascertained that in the water of the region round the town of the *Cazembe's*—*Luapula*—*Luapula*, at *Luapula* (*Zambesi*), they remarked, with a smile, 'He says the *Luapula* flows into the *Zambesi*—did you ever hear such nonsense?' or words to that effect. Their geographical ~~views~~ ^{views} are now only stated without any further comment than that the *Luapula*—even by the *Arabs* and *Portuguese*—shows that the *Luapula* is in or crossed on the way to the *Cazembe's*, and we may see that we have never found any difficulty from the alleged uncertainty of the negro to tell which way a river flows."

Although it is a great trading highway with the *Arabs* and natives, no European traveller has passed north-eastward of the *Cazembe's* city.

To carry the argument that the waters flow north-eastward farther, we derive some information from another region, that of Lake *Tanganyika*.

All recorded testimony acquired from the natives prior to the first East Africa expedition, and information given to Captain *Burton*, and every pains taken, both by that traveller and Captain *Speke*, while in the country, only lead to one conclusion—that at the south end of *Tanganyika* Lake a river, the *Ruvuvu* or *Murungu*, runs into it; and it is only of late that any theory has made it run on, and so join the *Nyassa* Lake. There is nothing more certain known now of any particular of the great *Tanganyika* Lake than was acquired in the first and only visit made to it in February to May, 1858; and as the geographical relation of this great and important body of water to African hydrology rests upon a single and very questionable observation, a few brief, though well known, particulars are here cited.

The first East Africa expedition, sent out by the Royal Geographical Society in October, 1856, was organised and arranged by Captain *Burton*. He was joined by Captain *Speke* at Cairo, November, 1856, and finally left *Zanzibar* for the interior in June 1857. This fine undertaking was most inadequately subsidized. Only 1000*l.* was supplied by the Government, through the Society, 700*l.* at the outset, and 250*l.* on their return. The rest of the total cost, 2500*l.*, was defrayed jointly by the travellers themselves.

It succeeded beyond expectation, and I think that I am warranted in stating that there never was an expedition based on such limited means, traversing an entirely unknown country, through miseries and difficulties only then first ascertained, which brought to the knowledge of civilized man such a harvest of information on almost every branch of interest. The topography of Captain *Speke* is wonderfully perfect, considering his

* * The *Zambesi* and its Tributaries, pp. 532, 533.

health and means of observation; and the 25th volume of the Society's Journal contains a masterpiece of descriptive geography.

Delayed, tormented, deserted, and robbed by their escort and party, with health broken by the densely bilious remittents of the coast region, the travellers struggled on over the high table-land (2500 to 3500 feet) between the coast ranges of the Hafuts and Rubeko Mountains, and reached the settlement of Muskat Arabs at Kazeh in Unyanyembe, where they received a warm welcome. This was on November 7th, 1857, and at the elevation of about 3500 feet. Their well kept journals and observations on this part of the route are perfectly satisfactory.

About this time, I believe, for the record is lost, they broke their trustworthy hypsometrical apparatus, and subsequently had to depend on much less perfect instruments.

They were too long delayed here by sore illness, and before they could start the great rains had set in. Under these most adverse conditions did these brave men struggle on down the pestiferous course of the Malagarazi River. Captain Speke was so affected by the climate and season that he became blind, and Captain Burton became partially paralyzed in the extremities, so that he had to be carried in a hammock to the great lake. They reached Ujiji, on the shore of the Tanganyika Lake, then seen for the first time, on February 18th, 1858. A single observation of Captain Speke, with what he described to me as a "bath" thermometer, gave as the elevation of the lake 1844 feet. But this thermometer read 214° instead of 212°, when brought down to the east coast again. Captain Speke's second expedition will perhaps indicate when the index error, which subsequently increased to this great extent, became sensible. There was only one lunar observation taken for the longitude of Ujiji, which point determines the position of the lake and this was discarded and the position laid down from dead reckoning; but I believe that it cannot be far wrong. How energetically the intrepid travellers essayed, without success, to reach the north end of the lake, and thus solve the great secret, has been often told.

They had, however, seen what appeared to be the end of the lake, in lat. 3° 8' S., and the impressions then received were placed on the map No. 1 by Captain Speke.

The general character of Tanganyika Lake, as ascertained by observations and by hearsay, was as follows — From Ujiji to the north end, as far as was seen, was about 100 geographical miles. Captain Burton estimated, from report, that it was 150 miles from Ujiji to the south end, making it 250 miles in length. Captain Speke's maps extend this considerably. His first

map makes its south end 230 miles from Lupp, terminating on lat. 8° 30' s. His second map abridges this to lat. 8° 6'. His first published map reduces it to lat. 7° 45', like Captain Burton's estimate. This would be within 80 or 100 miles of Lacenda, the Cazembe capital.

It is evidently very deep, but no soundings could be taken. No mention is made, or evidence seen, of any change of level.

The general formation suggests the idea of a volcano of depression, not like the Victoria Nyanza or Tkerewe, a vast reservoir, formed by the drainage of mountains. Judging from the eye, the walls of this basin rise in an almost continuous curtain, rarely waving and inflected, to 2000 or 3000 feet above the water-level. The water appears deliciously sweet and pure. The people, however, who drink it willingly, prefer the water from the little springs on its shores, and also that from Nyanza. It appears to corrode metal and leather.*

The principal rivers were the Malagarazi, which rises in Uinza, and, after a course of about 250 or 260 miles, falls into the eastern side of the lake, 15 miles below Lupp. The Marungu, or Runagwa, of which mention has been made, and which is about equal in volume to the Malagarazi, enters it from the west, or south-west at its southernmost extremity, and is almost certainly the same river as the Luapula, which passes north-east of the Cazembo capital.

The third river, which is said to be larger than the Marungu and Malagarazi united, is the Rusizi, at its north end. Until Burton and Speke visited Urira at its north end, April 25, 1856, all testimony unvaryingly stated that it ran OUT of the lake. Then, and only on this occasion, did they hear, from the sons of the local chief, Mumbas, that it ran INTO the lake † Their lawless crew of unruly Wappi savages would not allow them to go to it, and thus has the most important question remained a matter for dispute and discussion till the present day.

Upon this information, and upon the supposed depression of the lake below the lands to the northward, Captain Burton argued that it was a still lake, one without an outlet.

In the many conversations I had with Captain Speke on this topic, as well as with Captain Burton, shortly after their return, I endeavoured to combat this view, but being at that time in entire ignorance of the upper course of the White Nile, no solution could be found for what seemed to be then an insuperable difficulty.

* "Journal," vol. xx x., 1855, p. 234 &c.

† See Capt. Burton, in "Journal," vol. xxxv., 1855, p. 4.

That an inland sea, of such magnitude, receiving the drainage of such a great extent of country, in a climate where the evaporation bears a large proportion to the rainfall, it is quite incredible that its waters should be FRESH. In the countless ages since its formation, it must have become saline, like the Dead Sea, as an extreme case, or the Caspian as another, or the Shurwa Lake of Dr. Livingstone, the deep waters of which are brackish, and taste like a weak solution of Epsom salts. Every other known lake without an outlet is, I believe, of the same character, saline, and varying in its level.

If this be granted, as I presume must be done by every geographer, there are only three solutions to the problem. First, that it has an outlet to the Indian Ocean south of the route of the two East Africa expeditions; or, secondly, that some river runs to the westward, forming an affluent of the Congo, or other large Atlantic river; or, thirdly, that it drains northward, to which argument these remarks tend.

In the first place, its outlet cannot run towards the Indian Ocean, to the northward of the parallel of its southern end, for that region was perfectly explored by Burton, Speke, and Grant. The Lutgi River, which debouches in lat. 8° $0'$ S., has not been examined, but its known character will not admit of such a supposition. Its upper course, known as the Ruaha, traverses the upland desert only in the rainy season, and the space between its occasional sources, and the south end of Tanganyika Lake, is constantly traversed by the Arab caravans passing from Zanzibar towards Lucenda, for ivory, and Kitanda, or Kitata, south of the Cazembe's for copper. These cross or pass a shallow morass or lake, the Rukwa lagoon, which, at times, joins the Tanganyika Lake. No river is crossed. The Ruaha, whose real sources are still unknown, is not passed. It cannot then run eastward.

The second alternative is that it drains to the westward, or in other words, that it either contains the source of the Congo, whose mouth is 1100 miles from the western shore of the lake, or that the waters flowing westward are finally absorbed by evaporation. To combat these views with the facts at command would lead far beyond the limits of this paper. Suffice it to say, that several routes to the westward of the Tanganyika, not only negative this, but also would almost prove that the waters flow into the lake. The great distance will present now the most cogent argument against this, while we have the third, that the Rusizi River is an affluent.

The third point I would insist on is this northern outlet of the lake.

The additional knowledge we now have places this matter in

a very different position to what it was in 1859, and accordingly I now aver that, if our late data be correct, there can be no other solution to the Nile question. I will name the difficulties as they have arisen.

After Burton and Speke had finished their exploration of Tanganyika, and become somewhat improved in health by their stay of nearly three months on the lake, they returned, with means almost exhausted, to Kazeh; and here Captain Speke quite recovered from his partial blindness, and from the effects of a small beetle which penetrated his ear, and suppurated away, completed the rough outline of their route, and forwarded it to England, with the map No. 1, which shows that they conceived that the Tanganyika continued to a valley open to the N.W. Captain Speke, leaving Burton to prepare for their return march, then started for the northern or Ukerewe Lake, July 9th and on August 1st observed it to be higher than Kazeh, or 3,740 feet. This, also, was an imperfect result, from the defective thermometer. Returning to Kazeh, they collected the remnant of their property, and retraced their steps to the coast.

After having visited the Ukerewe, or Victoria Nyanza, Captain Speke was finally convinced that this was the true and *only* head of the Nile. That it is one of these reservoirs, no one can doubt. But in order to account for the supposed southern flow of the Kuzizi River, he drew the range of lofty mountains around the head of the lake, and between it and his own Lake Victoria, at a distance of 150 to 170 miles to the northward. These were purely hypothetical, as they were never seen or heard of. Their relation to the first map, sent after their return from Tanganyika, may be seen by reference to sketch No. 2, which is placed on the same parallel on the paper.

The second East Africa expedition, under Captains Speke and Grant, went over precisely the same ground that the first had done, except where crossing the lofty coast ranges. Arrived at the upper plateau, we find that the thermometric observations in the second expedition, as compared with the first, give a lower elevation of about 350 feet, to the country up to within 40 miles of Kazeh, their crucial station, but here the second elevations exceed the first by about 100 feet. It is probable, therefore, that moreabout the instruments in the first expedition began to fail.

It has been objected that these absolute and independent observations by the thermometer involve a fallacy, as the difference of level thus shown must be dependent on the varying pressure of the atmosphere: but to this may be replied that

this region is so near to the equator, that the diurnal or secular variations of the barometer are nearly at a minimum, and that the whole range, except during cyclones or hurricanes, does not exceed a very few tenths of an inch in the mercurial column (each tenth of an inch representing 85 feet of elevation); and that all the observations relating to this point were taken under the same circumstances. Most certainly absolute accuracy must not be demanded for them—at best they can be but approximations.

Captain Speke made the elevation of the north side of his Victoria Nyanza (in his second expedition), to be 132 feet lower than in the first; and between this point and Gondokoro he made FOUR other observations, to which I wish to draw special attention. The first is near Kamrasi's Palace (Luluga), 2850 feet; the second at the Karuma Falls, 2970 feet; the third, South Luluga, between Karuma Falls and Kamrasi's, 2900 feet, and Paima, 18 miles south of the junction of the Asua River, 1763 feet. (Sir Samuel Baker says that the Nile, issuing from the Albert Nyanza, is navigable as far as this, and therefore they are on the same level.) Finally, Gondokoro was made to be 1298 feet above the sea. Captain Speke's thermometers, I believe, were not brought home, and therefore, their index errors, which were probably considerable, cannot now be ascertained. But they are all relative to each other, and one common correction would apply to all.

Captain Speke found of the Great Lake to the westward of Kamrasi, since explored by Sir Samuel Baker and his lady, and named by him the Albert Nyanza. This lake was also reported to be in almost the same position by Mr Petherick, from information given to him by his man Mussaad, who went southward to within four days' march north-west of the north end of the lake. It was also announced by Dr. Penev, May 20th, 1861; he had then got beyond the cataracts of Mukoba and heard of it. His death prevented his exploring it. M. Debono was associated with him.

In addition to this lake, Captain Speke places another, the Rusizi Lake, at the distance of 110 miles due north of the north extremity of the Tanganyika Lake, and connects them by the Rusizi River, which passes through Uzige country. This Rusizi Lake, therefore, lies in the heart of the mountains he inferred to exist in 1858.

The names Uji, Rusizi, Uzige, and Nzige, which are placed on this line by Captain Speke, have a great resemblance to each other.

Mr. Consul Petherick reached Gondokoro February 20th,

1843, and made the elevation by thermometer R. P. (three observations) 1265 feet, a remarkable coincidence with those of Captain Speke's—they are identical*.

Mr. Petherick gave a similar thermometer to Sir Samuel Baker, who had arrived at Gondokoro a few days previously; and this also has been returned and tested,† so that its error, and the application of the difference, is not only available for its own results, but will also test and correct those which can be directly connected with it.

Sir Samuel Baker and his lady ascended the river on the track which had been descended by Captains Speke and Grant; and with this thermometer of Mr. Casella's he observed the altitude at the four places I have mentioned above as having been observed by Captain Speke. For the sake of comparison they are placed (with Gondokoro) in juxtaposition below; those of Captains Speke and Grant being uncorrected, and those of Sir Samuel Baker, with those final corrections determined on at Kew.

	Speke.		Sir S. Baker.	Difference.
Laluga Kamrasi's) ..	2655 ft.	Mroodi (do.) ..	4003 ft.	1245 ft.
Komina Falls	2970	.. ..	3971	1026
S. Laluga	2505	.. ..	4656	1150
Paura	1791	(R. Nile, near) ..	2720	927
Gondokoro	1798		1999	701

Mean of the five differences, 1002 ft.

We have thus a clear difference between Captain Speke and Sir Samuel Baker of 1000 feet, at nearly, or quite, the same places. This may seem to be a very large proportion of the entire elevations, but it should be remembered that even in the last one, Gondokoro, it has been thought necessary to add 700 feet to the result obtained by Mr. Petherick with the same instrument.

This difference of 1000 feet must therefore be either subtracted from Sir Samuel Baker's elevations or added to Captain Speke's, one or the other will prove the point I wish to insist on here.

Not only will this correction regulate the observations made in Captain Speke's second expedition, but it will apply to those made in the first, as the second passed over the same ground.

It has been said above that the second expedition made Kazei 92 feet, as a mean higher than did the first. Therefore

* Mr. Petherick's observations are given in the 'Journal,' 1866, vol. xxiv., p. 400.

† See 'Journal,' 1866, vol. xxiv., p. 16, where Sir S. Baker's observations are computed and investigated by Mr. Dunkin.

the observation at Tanganyika must also be brought in, as it was made by the same instrument, placing it at 1844 feet.

Now as Captain Speke's measurements throughout are consistent with each other, if we accept them as correct, it is perfectly possible for Tanganyika Lake at 1844 feet to flow into Gondokoro at 1298 feet, past Paim at 1793 feet elevation.

But then Sir Samuel Baker makes the Albert Nyanza to be elevated 2720 feet. If we take Captain Speke's observations as correct, this must be *reduced* to 1720 feet, identical with Captain Speke's observations at Paim, nearly or quite on the lake-level. Or, what is much more reasonable, we must apply the known correction by Sir Samuel Baker's thermometer to Captain Speke's observation, acknowledged to be imperfect; this will bring Tanganyika Lake up to 2844 feet, or **124 FEET ABOVE THE ALBERT NYANZA.**

Either of these views will quite determine the question as to the POSSIBILITY of Lake Tanganyika being connected with the Albert Nyanza.

Without claiming for these hypsometrical observations any refinement—they can be but simple approximations—and putting aside minor differences, it may be broadly stated that these two great western lakes are on the same level.

It is not necessary here to apply this reasoning to the stated elevation of the Victoria Nyanza, though of course it must fall into the same category, for no one can doubt but that the waters seen by Captain Speke to flow from the direction of its northern side finally enter the Nile.

Having disposed of the question of elevation, the next point is the geographical position of the lakes. This is most simply met.

Captain Speke heard, in 1861-2, of a lake, the *Rasiz*, due north of the Tanganyika Lake, and lying between latitudes 1° and 2° s., westward of the lofty Mfumbiro Peak.

Sir Samuel Baker sailed down the north-eastern side of the lake, past its abrupt cliffs of granite and gneiss, rising abruptly from the water to 1,000 and 1,500 feet high, and heard from King Kumanika and many natives that it was well known as far as between latitudes 1 and 2° s., when it, turns to the westward, the extent being unknown even to Kumanika, king of Karungwe.

This enormous lake, thus at least 200 miles in length, embosomed in lofty mountains on either hand, extends to and covers the site of the *Rasiz* Lake, heard of by Captain Speke, and passes over his mountains of 1858.

Who then, can doubt, if the data we possess be worth anything, but that they are one and the same lake?

I therefore claim for Lake Tanganyika, as I did in 1859, when I believe I stood alone, the honour of being the SOUTHERNMOST RESERVOIR OF THE NILE, until some more positive evidence, by actual observation, shall otherwise determine it.

The points, then, which I have endeavoured to prove are: that Dr. Livingstone, by determining the division of the water-flow to the westward of his Nyassa Lake, in September, 1853, had probably reached some of those occasional streamlets which feed the Nile.

That in his last journey, by continuing westward, he had determined that no *large* river entered the north end of the Nyassa Lake, and therefore determined the watershed between the Nile and Zambesi systems.

That all evidence acquired by the Portuguese travellers, read in the light brought to the subject by recent investigation, tends to the certainty of the truth of Burton and Speke's assertion, that the water *enters* the south end of Tanganyika Lake.

That Captain Speke's single observation as to the elevation of that lake is probably erroneous to the extent of the index error showed by his therm. meter on the sea-shore, 2°, equal to about 1000 feet; and that otherwise, if Sir S. Baker's observations and information be correct, his Albert Nyanza would flow to the southward, the contrary of which he has proved.

The true sources of the Nile must be looked for in the mountains west and north-west of the Nyassa Lake or in the great Serra Machinga of the Portuguese travellers, between latitudes 11° and 12° s.; thus adding 600 miles to the known course of that wonderful river, to which each new discovery adds a new interest.*

The final solution of this most ancient and most interesting problem would indeed be a geographical triumph. I earnestly hope that it may be claimed soon by the Royal Geographical Society, which has done so much to clear away the dark clouds of mystery in which it was enshrouled ten years ago.

But there is another aspect in which the inquiry would place itself in a practical sense, and this to many may be considered of greater importance than the solution of an abstract geographical problem. To what good can such a discovery be applied? A few words will, I think, demonstrate this.

* The length of the Nile's course from Gondokoro to its mouth, following its major windings, is about 2400 geographical miles (or 2780 British miles). From Gondokoro, near to which, it was generally argued, ten years ago, that the southernmost head of the Nile would be found to the south end of Tanganyika Lake, is 800 geographical miles or 920 British miles. If the source be near the Makungu Kunge, it must be 200 geographical miles or 230 British miles still further south, so that its total course will be 3400 geographical, or 4050 British miles — almost unparalleled by any other river.

At present the commerce of the Upper Nile is transported by water as far as Gondokoro, and ceases a few miles above it.

If this branch of the Great Nile be navigable southward from the Makelo or Apudlo Cataracts, down the Albert Lake to its southern end, a distance of 400 miles, and if the Rusizi River be a continuation of it, at the same level, as at present appears, it may extend this navigable part of the Upper Nile for 340 miles further, to the head of the Tanganyika Lake, and to within a few miles of the great African capital of the Cazembe, one of the chief ivory marts, and also near to Kitanga or Kitata, the copper mart.

We should have thus an additional 750 or 800 miles of water-carriage for that commerce which ought to be the best pioneer of civilisation in these otherwise unapproachable regions. A few vessels of shallow draught, impelled by steam or sail, would interrupt the whole of the traffic which is now carried on with the greatest vigour between the vast and entirely unknown west, and the infamous slave-depôts on the shores of the Indian Ocean.

As is well known, the chief article of the export trade ivory, would be nearly worthless in the interior without selling as a slave the porter who brings it to the coast. By diverting this double traffic to the northward, to the Egyptian ports at Gondokoro or elsewhere, we, as a nation, could have very much more influence in repressing the trade in the human portion of it than is now possible at the well-known ports of Mombas, Ibo, Quilua, and many other notorious places.

If by further exploration it could be determined that such a line of navigation is practicable, and which would be transverse to that now carried on, commercial enterprise, in some form, might soon be established there. This would cut off the slave trade from between the western countries and the coast.

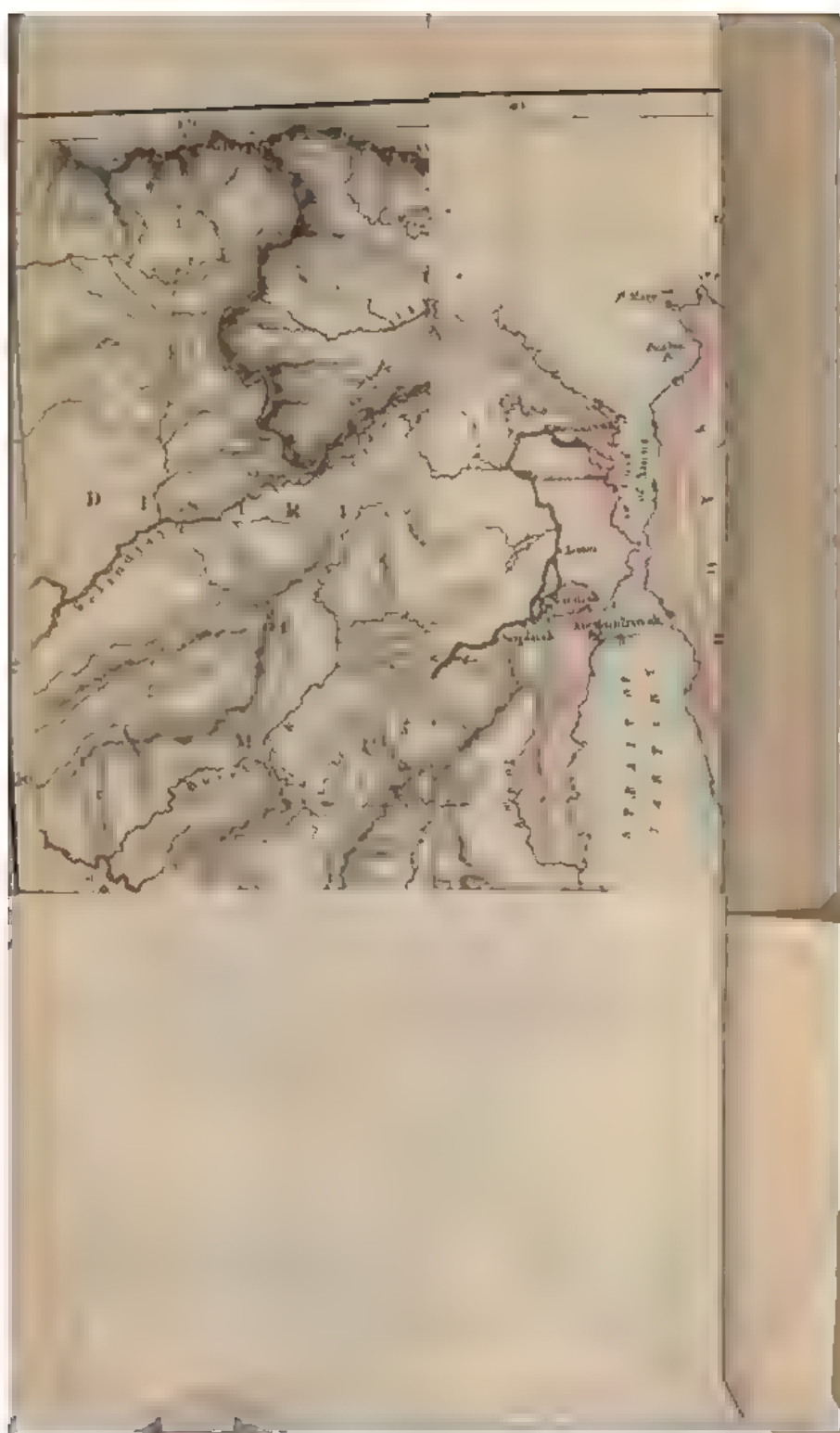
XI.—*Notes on the Russian Harbours on the Coast of Manchuria.*

By Rev. W. V. LLOYD, B.S., F.R.G.S.

(Rout, June 24, 1857)

On the 20th of July, 1856, H.M.S. *Seylla*, Captain Courtenay, left Nagasaki, Japan, with orders to visit the different Russian settlements on the east coast of Manchuria, from the southern boundary of their late acquisition of Chinese territory, the "Tumen" River, to Castrics Bay along the west coast of Sakhalin to the seemingly unsettled boundary on the 48° parallel of latitude) between them and the Japanese: also the ports of the





latter on the west coast of Sakhalin below the above parallel of latitude, and in Amura Bay.

We left Nagasaki Harbour in a perfect torrent of rain, with a head-wind and sea, under steam; and we were compelled by the thickness of the weather to pass outside the "Goto" Islands. The weather continued thick, with heavy rain, until we reached the latitude of Chosan Harbour in Corea, at the northern exit of the west Corea strait. This harbour was discovered by Broughton in October, 1797. The regular inhabitants number between 6000 and 8000, and occupy four villages at the head of the harbour; but during the fishing season, in autumn, all Corea seems to crowd to the coast in pursuit of the "ribbon" fish. The natives enjoy the reputation of being noisy, dirty, and dexterous thieves, given to them by those who but casually have visited this part of the coast. Upon the female portion of the community seems to devolve the rice cultivation. Either by a treaty right or permission of the Japanese, they resort during the summer months to the island of Tsu-sima, where good wood for ship-building abounds, to build their junks, which, with the exception of a few iron clamps, are wood-fastened, and of unseasoned timber. This part of the coast of Corea is destitute of wood for this purpose.

At Chosan Harbour a colony of about 300 Japanese military men has been established since the time of Taiko-sama; and from all we could learn this seems to be the only result of the latter's conquest or temporary occupation of the south-eastern coast of Corea. No one seems to have heard or seen anything of a Japanese in the neighbourhood of the Tu-men River, or northern portion of the country. The families of these "Jacobins" are left behind on the opposite island of Tsu-sima. The Coreans give a somewhat different account of the nature of this Japanese settlement at Chosan. They admit that they are tributary to the Emperor of China, and that the annual embassy to the court of Peking are the bearers of the coveted treasures of ginseng and saffers, but they stoutly deny a similar relation to the Government of Japan. They, moreover insist that the Japanese are tributary to their Emperor at Wang-ching (in Corean Seoul, i.e., ching or court), the capital, and that the latter Prince appoints an ambassador to the court of Yeddo on the accession of a new Tycoon. Taiko-sama's boasted conquest is by them construed into a disastrous defeat, the result of which is that, as an evidence or assurance of future pacific relations, hostages to the above number of Japanese are bound by treaty to a perpetual residence at Chosan, where they are as closely watched and restricted in commerce as were the Dutch formerly at Decima.

There evidently exists some doubt as to the position of Wang-ching, Seoul, or King-ki-tao, the capital of Corea. Black's Atlas gives the latter name, which is really that of the province in which it is situated, as the capital, which I believe is rightly placed on the north side of the Han River, which empties itself on the west coast into the Yellow Sea. However, under the heading of Port Lazaref, Oun-gan (Eastern) River, our sailing directions state that Admiral Guerin visited this port in the *Virginie* in 1855, that he found the surrounding country well cultivated and populous, especially at the river's mouth, where there is a large village, believed to be the commercial emporium of Sé ul, the capital, which is supposed by the French to be 30 miles inland; a position it is impossible to identify with the "King-ki-tao" of our Atlas. Port Lazaref is in Broughton Bay on the east coast of Corea. Tsu-sima is, I expect, the island where the Russians might have been tempted to form a permanent settlement, had it not been for the timely interference of Admiral Hye.

With a fair wind, varying from south-east to south-west, accompanied by occasional heavy fogs up to the 24th, and with fine clear weather on the 25th of July, we anchored opposite the Russian military settlement of *Novogorodaki* (Ponette of the Chart), at the entrance of *Novogrod Harbour* in Expedition Bay. Far away to the south-westward extended the mighty Shan-Ain range of mountains, the cradle of the Manchu conquerors of China, and the home of the present dynasty. The general aspect of the country is a dreary one. As far as the eye could reach in the remote distance there was nothing to meet the view but a suggestion of hill and dale, green, but devoid of timber; suggestive, however, of the Cheviot Hills and sheep pasturage, or of the west coast of Cornwall and mineral wealth. A Corean hut, surrounded by a rudely-fenced garden, half-a-dozen Tartar ponies, and a couple of cows might, by diligent observation, be seen here and there, the solitary evidences of a habitable region. Were it not for the dozen log-houses which mark the site of the Russian military settlement, there was nothing to disturb the dream of historic Scythia, and her wild hordes of Tungusian shepherds, roving uncontrolled in search of pasture for their flocks. These few wooden houses, however, mark a great era of change. The khans, the descendants of the great Zingis, no longer rule over this wilderness of verdure. Russia has long coveted, and at last found, on this eastern coast of Manchuria a harbour, where her fleets can pass in and out during the winter season; one perfectly sheltered by surrounding hills, with deep water, an impregnable position, and a good supply of coal. At the base of the northern limit of the Shan-Ain range runs the

Tu-men River, the boundary between Russian Tartary and Corea, as settled by the Russo-Chinese Treaty of the 14th of November, 1860. This southern limit of Russian territory is given in the charts as $4\frac{1}{2}$ miles east of Saiso Point, lat. $42^{\circ} 18' N$. The distance of this range of hills from Novgorodski we estimated at 30 miles, and that of the Tu-men River running at the base at about 20 miles. It has been surveyed by the *Acteon's* boats 10 miles from its mouth. The neighbourhood of this river and that of its tributaries is considered the most populous of any on the east coast of Chinese Tartary. The Chinese (Manchu) town of Hing Ch'un (Hun-chun), or "Hwan-chun-ching," 25 miles from the mouth of the Tu-men (or Mia-kialg), with a population variously estimated at from 6000 to 10,000 inhabitants, is within a day's ride on a Tartar pony from Novgorodski. It is conveniently situated at the confluence of the Hun-chun River and the Tu-men, 9 miles to the north, or Chinese side, of the treaty boundary line. It is one of the only two Chinese towns bordering on Corea where the restrictive commercial policy of China permits an interchange of commodities between Corea and Chinese Manchuria. A Chinese mandarin of the second class, with about 300 soldiers, maintains order and levies imposts. The Manchus repair hither from a great distance to carry on trade. By a short-sighted policy the general trade is restricted to half a day once every two years, and some mandarins only enjoy the privilege to trade annually for five days. The Manchus supply the Koreans with dogs, cats, pipes, leather, stag-horn, copper, horses, mules, and asses, and receive, in return, baskets, kitchen furniture, rice, corn, furs, paper, mats, swine, oxen, and ponies; the latter highly prized for their swiftness. Hing Ch'un is also famous for its trade in *harshaw*, a marine sea weed found in the neighbouring sea. On the Russian side of the line a considerable village or town, of a mixed population of Koreans and Manchus, fugitives probably from the exactions of their respective mandarins, is located on the River Ching-hing (of the charts), when, from its south-westerly direction from the southern side of Expedition Bay, seems to afford a water-communication with the Tu-men on the south or Russian side of the treaty line.

Since the cession of this portion of Manchuria, Russia has taken complete military possession of the coast, as well as of the right bank of the Ussuri and Khinka Lake. Drafts of regiments or of sailors are established every 10 miles along the coast, the men of which are diligently employed in making the great military road which is to connect this settlement with the Amur. The number allotted to Novgorodski is 100 of the 4th Regiment, the head-quarters of which are not far distant. The men,

under a captain (who is commandant of the station), were actively engaged in all kinds of manual labour. They work the coal-mines, load and unload the ships, and were erecting a block-house, store, or residence, for a Hamburg merchant, for which the latter was paying smartly. In fact they seem to exercise a close monopoly of the labour market. There is great difficulty in obtaining the assistance of the few scattered Koreans in the immediate neighbourhood, which, when obtained, is of small account, in consequence of their general disinclination to work at anything. The few Manchus or Chinese are generally engaged in trade. The soldiery are seemingly European Russians, with light hair and powerful frames; in fact, some of the finest men I have ever seen. They are well clothed, and with a supply of rations so far exceeding their daily wants as to enable them to exchange a portion of the latter for drink at the store. The pay is inconsiderable; report says one rouble (3s. 2½d.) a year; but as frequent opportunities of pecuniary remuneration are offered by the stringency of the labour market, of which they are generally permitted to avail themselves, the prudent, industrious man may always have the command of money. A merchant assured me that, as a rule, they were better off than the officers, and that several of them had their 500 or 1,000 dollars. From a similar source we drew the information that that service in this section of the Government of Eastern Siberia was more lucrative than honourable; that men under either political or social disqualifications were drafted into regiments serving here. The Lieutenant had seen twenty-five years service, and the sun under every variety of climate. He stated that telegraphic communication had reached the Amur, and that two or three months would suffice to complete the line to this station.

On inquiring whether foreigners were at liberty to settle here or at the other Russian ports along the coast and whether there was any commercial tariff established by the Government, we were assured that foreigners were at liberty to settle when and where they liked that an ukase of the Emperor granted and would facilitate the free exploration of minerals, and that Novgorodsk was "a free port." But from official quarters we were informed that the vast extent, centralized system, and multitudinous interests, of this vast empire demanded a gradation of references from the lower powers in Siberia to the higher powers at St. Petersburg before legal grants or rights could be secured: this sadly dims the bright visions of the intending explorer or settler. The diligent observer would find it difficult to discover a single gold-ore or a single ounce of marketable stuff, which was not either Russian or for the use of Russian soldiers. Three says

were, however, in the harbour awaiting cargoes of edible seaweed, *Bêche-de-mer*, fried fish, ginseng, &c., for the Chintoo market. Chinese supercargoes were said to be in the interior, on the Tu-men, or some of its tributaries, probably making their necessary arrangements, as far away from mandarins as possible, for a supply. The Koreans on the right bank of the Tu-men are equally averse to mandarin exaction, and doubtless afford every facility to the Chinese merchant from the Shantung promontory in supplying cargo, via the Russian frontier, to the conveniently "free port" of Novogorodsk. The exactions of the "Tung-pu-en-men," or Korean gate, near the northern bank of the Ta-lu River, about 15 miles from the Chinese town of Feng-tse-ching, opened for trade three times a year with the Koreans, must necessarily tend to throw this trade into the hands of merchants or coasters visiting the ports of Russian Tartary and the east coast of Corea. It is not denied that a great deal of the trade of this coast with the Shantung promontory and Che-foo is contraband.

These remarks are sufficient to show that Novgorodski, apart from other considerations, has a very respectable commercial future. This at present seems secondary to the idea of military occupation. At present the houses of the settlement are either barracks or military stores-houses. Lines of communication along the seaboard to the east, and by the Usuri and its tributaries to the west, of the Shun-Alin, or coast-range of Russian Tustary, are being gradually opened and perfected; which will not only bring in necessary supplies to, but a more rigorous supervision over, these out-lying stations.

Russia is perfectly alive to the political, naval, military, and commercial importance of the position of Peaslee, or, as it is now called, Novogorodsk. The Siberian section of the Imperial Russian Geographical Society has issued its report* from Irkutsk as recently as last year (1865), in which

* The Peking Correspondent of the "China Express" gives an interesting extract from his report:—"Pescadore, and 240 vessels from the Korean frontier to the southernmost gulf of the Russian shore of the Sea of Japan. In it are found what are known now under the names of Pallas Bay, Expedition Bay, and Novogorod Harbour." After which the writer goes on to prove the political, naval, and commercial importance of the gulf.

"1. It borders immediately on Korea, which is independent of China, and on Manchuria, which is virtually independent too. Establishing ourselves here with a firm hold, we practically assert the consolidated possession by Russia of the entire northern shore of the Sea of Japan up to the mouth of the Amoor, sealed already by treaty. Possessing a sufficient force, we might influence Korea, a weak but up to this time inaccessible country, destined in its turn, like other decrepit countries in the East to yield to Western means."

Under the second head the writer goes fairly into the advantages of this position from a defensive and aggressive point of view.

"Commercially, it is the only one of our naval stations bordering on a populous

the many advantages of the situation are enlarged upon and duly estimated. It has its future. It is to be the head-quarters of the Manchurian coast. Korsakoff, Governor and Commander-in-Chief of Eastern Siberia, was expected in a few weeks to establish a new order of things, and to give a fresh impetus to Russian progression southwards. The great importance to Russia of this port lies in its being an open harbour nearly all the year round. Last year, or rather winter, there was no ice of sufficient consequence to prevent the ingress and egress of vessels. It is true that it was an exceptional season. Six weeks were stated to be the limit of obstruction by ice in former years to the navigation of the inner harbour. This is an advantage not possessed to the same extent by any other of the many capacious, well-sheltered harbours in the bight of Peter-the-Great, or Victoria Bay; and farther north the harbours are closed to navigation for three, four, and six months. Coal-mines are being worked here: the present demand being small, they are being worked as inexpensively as possible. The only attempt at a labour-saving machine consists of a simple wheel-and-axle apparatus, made of wood, at the mouth of the principal pit and at the head of the shafts, for lifting the water which has accumulated after the late heavy rains. There are three shafts and as many adits; one only seemed to be in working order, opposite to which there was a heap of coal estimated at 100 tons. The depth of this pit was said to be 140 feet. The coal is 3 dollars a ton at the pit's mouth. Our chief engineer pronounced it of a very bituminous character, with a percentage of ash and clinker of 20 per cent; that compared with the Japanese coal at Nagasaki, price 6 dollars, the Nivogorodski coal was worth 8 dollars the ton; that it was admirably suited for short voyages, but its free combustion caused so rapid a deposition of soot in the tubes that they soon choked without sweeping; that its use would prove a serious disadvantage and delay on a long steaming voyage. One specimen, analysed by a Russian mineralogist, yielded about 71 per cent. of carbon. This coal will doubtless improve as the mines are farther worked.

District. On one side, 25 versts from Expedition Bay, stands the Chinese town of Hung Ch'ün, with a population of about 20,000, then there are the valleys of the river Hung Ch'ün and its tributaries, which are also thickly peopled with Chinese. On the other side on the banks of the Tumen, are seen many large Chinese villages, whose inhabitants occupy themselves with agricultural pursuits. By making use of the water communication afforded by the Tumen, commercial influence will spread farther and further in that direction, as far as the important river Manchurian towns of Nenget and Kirin, about 250 versts from Hung Ch'ün. We of course shall not delay in developing the navigation of the Tumen. He proposes "powerful small steamers drawing 2 feet, primarily for the use of vessels loading &c. on Expedition Bay and in case of necessity for the navigation of the Tumen." (*London and China Express*, May 26, 1866.)

However, we heard that the Russian men-of-war calling here seemed disinclined to use it, if they had a sufficient supply of a better quality to carry them on to their destination. There was a report of exhaustion, and of the difficulties of getting rid of the water, also that Russian men-of-war had entered the port for coal and had not received a sufficient supply to meet their wants, but the general impression is that a better supply of skilled labour and steam-machinery would find all the coal they may need.

To any one capable of appreciating the commercial advantages of the position, the importance of this post cannot be underrated. It seems to possess the peculiar advantage of position and relation to the sea of Japan and the bordering countries which Hongkong holds to the neighbouring provinces of China. It can offer a convenient, free, and secure port, under the protection of a firm, liberal, high-minded Government, under whose eyes, for sound reasons of political economy, if from no higher motive, a refuge may be offered to traders whose business relations otherwise necessarily throw them into the hands of a rapacious set of mandarin officials. The "squeeze" system—tempered and mitigated as it is in China by the neighbourhood of European ports, by foreign consuls, and by intelligent and occasionally high-minded Chinese officials—knows nothing of the horrors and cruel expedients of the system as interpreted by the provincial Manchu mandarins in their dealings with the people and tribes south of the Amur. The recent protection of a Russian garrison at Novogorodski has already induced more than three hundred families of Koreans to establish themselves within the Russian line; and the knowledge that the people are beginning to taste the sweets of Russian rule has caused the Korean officials to resort to extreme measures in the punishment of these new converts to "Western ideas," if afterwards caught on the deserted side of the boundary line. As there are none very convenient harbours farther south, and as we hear something about small steamers, "drawing two feet of water," for the navigation of such forbidden waters as those of the Upper Tu-men, it seems almost worth the while of our rulers to direct an occasional peep to be taken into these snug Korean harbours.

WLADIVOSTOCK, *i. e.* DOMINION OF THE EAST (PORT MAY),
RUSSIAN TARTARY.

On the 28th July we steamed from Novogorodski, which we left at 4 A.M., and arrived at Vladivostock at 4 P.M. of the same day. The general appearance of the country in this neigh-

bourhood differs widely from that of Novgorodski. Here the mountains or hills, from their summits, down their slopes, and the intervening valleys, are pretty well wooded. The loftier and more distant ranges from the sea-coast are much more so than the hills on the immediate coast. Several exceedingly picturesque bays, with the Homeric names of Paris, Dionisi, Ulysses, &c., appear to the right and left as you proceed up to the settlement through the "Eastern Bosphorus" strait, or "Golden Horn," which separates Russian Island from the Mognovskii Amurski promontory. Dismissing from the view the hollow-tree canoes, the odd oars with esentecheon-shaped blades, the Manchou or Oroko fishermen, the rest is not unlike that of English park scenery and country gentlemen's seats. The trees are here and there so isolated as to lend this character to the scene. The sportsman would still further in the early autumn, before the snow falls, realize this first impression, when the woods are well stocked with deer, pheasants, and other game. Tigers and bears but too frequently disenchant this quiet sylvan scene and annoy the scattered proprietors of ponies and oxen by occasionally walking off with them. In winter, hunger drives the tiger from his summer haunts in the Lak-hota-Alin, or coast-range of mountains, into the few settlements along the coast. One of these animals carried off a pony last winter from the end of the commandant's compound. Another carried off two Russian soldiers. A Russian officer told me that he had taken the skin of one, measuring 10 (marine) feet from his nose to the tip of his tail. These are the veritable Bengal species, and I was surprised to find that he was a constant inhabitant of the country up to 51° N. latitude, and that on predatory excursions to the left bank of the Amur, up to 53° N., he feeds upon the reindeer, seals, and the Delphinapterus. The native Tungusian tribes and Gilyaks hold him in great awe and veneration. One of them killed by a tiger is buried on the spot where his remains are found. The tiger also bears a very leading part in the transmigration of souls, as a vehicle of which his impersonation is typified in the half-beast, half-man idols of "Golde," "Gilyak," and "Oroko" superstitious worship. A Russian officer told me that he had disturbed a very large one making a meal off a fallow deer.

Possietto is entirely dependent upon this port for its supply of wood. There being a good supply of the latter for fuel, no coal-beds have as yet been opened here. Coal is, however, to be seen cropping up out of the surface. Near the sea-coast the trees are somewhat stunted in growth; still we saw some very good-sized oaks, alms, walnuts, and maples, some measuring 3 feet in diameter. At the steam saw-mills we saw some

good white pine, of which there must be a good supply further north; but none were seen growing in the neighbourhood. The soil here is of a very generous nature, and dark in colour. A couple of acres under cultivation yielded a good supply of such English vegetables as turnips, carrots, beets, radishes, onions, cabbages, &c., as well as the coarser kinds of the former for stall-feeding purposes during the winter season. The minimum temperature is, at intervals during the months of January, February, and March, 15° Fahr. to 20° Fahr., during which months the harbour is closed up by ice, and sleighs pass over from one side to the other. Periodical thaws during these months, and that of April, effectually stop communication. As far as the intentions of the Russian Government are concerned, there is every disposition to be liberal to settlers. Land of excellent quality, and not so heavily timbered as to preclude the possibility, where there is a limited supply of labour, of clearing a sufficient quantity for arable and meadow land is freely given. Their own settlers are said to be well fed, clothed, and provided with seed, stock, and necessary implements for two years, with Government officers on the spot to locate and direct, by a necessary superior intelligence, the natural obtuseness of the Russian peasant. With the exception of seven foreign merchants, the settlement may be said to be purely military, or composed of soldiers and sailors. The latter are well cared for. They get their 3 lbs. of rye-flour a day and a good supply of leather for their long boots and working gloves. To show that they have an abundant supply, it is not unusual for them to barter their surplus leather and flour for drink. Inebriety seems to be the besetting infirmity of these people. Alcohol is produced from anything containing sugar or starch. As long as it is strong, they do not trouble themselves about quality. The rest of the population is made up of convict or runaway Chinnamen and a few Koreans, who are represented as lazy and useless as labourers. They are said to prefer drink to a money payment. They are distinguishable from the other settlers by their small piercing dark eyes and regular features. Their style of head-dress is remarkable,—a tuft of hair standing erect, like a horn, in a line with the forehead and at right-angles to the top of the head. It is a mode of wearing the hair the very opposite to that adopted by the Japanese: the latter shaves the front of the forehead and down the centre of the head, leaving a tuft at the back of the head, which he bandolines and fastens into a flat position on the top of the head; but the Korean shaves the back of his head down the centre of the head to the forehead, leaving a tuft erect on the front of the head.

Compared with Novorodski (Possietto), Wladivostock (Port

May) may be said to be flourishing. The houses are more numerous, and, although still built of logs, are more substantial, roomy, and approaching the "gentle residence." The hotel is capacious, but misadministration in the supply of the table, descending to common necessities, has left it untenanted and in a state of hopefulness for better days. It has its church and "Papa" of the Greek Church.

The harbour is capacious, free from obstructions of convenient depth of water, and perfectly protected by surrounding hills gently sloping down to the water's edge, and affording a good natural drainage for any future town springing up on the site of the settlement. The general impression, or perhaps the wish of the few merchants here, is that although Novogorodski, from its better strategical position and comparative freedom from ice in winter, may be selected as the headquarters of the east coast, Wladivostok must be the commercial port. Without adopting this opinion, it may be said that it has an abundance of wood for building purposes and winter fuel, which to poor settlers in a rigorous climate is an important consideration, and an advantage which it possesses over Novogorodski, which has scarcely a tree. It is also nearer the great centre of communication (the Khinka Lake and Ussuri River) with the Russian provinces on the Amur. This lake empties itself by the Sungachan at the confluence of the latter with the Debikhu, or eastern branch of the Ussuri, into the latter river, by which there is steam communication with the Amur to Khabarovka. The nearest practicable route from Wladivostok to the point where steam communication commences is 100 versts, or 260 miles. The river Surfm at the head of Guérin Gulf, a distance of about 15 to 20 miles from Wladivostok, ascends and is navigable for goods-laden boats to within 40 miles of the Lelu River, which latter empties itself into the Khinka Lake. The Ma-hai River, at the head of Ussuri (Napoleon) Bay—which, by a land-carriage between it and the Debikhu, connects with the Ussuri—is not considered so practicable as the route by the Surfm, in consequence of the shallowness and rapidity of the Debikhu. A Russian engineer (*ingénieur des mines*) officer informed me that the neighbourhood of Khinka Lake was rich in minerals. Gold, silver, platinum, lead, and coal were to be found there. The Manchus frequently bring small parcels of gold of fine quality to this settlement for sale, but they overrate the market value of the precious metal, too much to enable the merchants to purchase much of it. Fine prairie lands are said to lie by the lake and beyond the mountains, where some Swiss emigrants propose settling when satisfactory arrangements can be made with the Russian Government.

The topographical engineer of the district, who took passage

with us to Nakhodka Harbour, informed us that he had accomplished the journey to Kabarovka, at the mouth of the Ussuri, in ten days. Subjoined are some interesting particulars of his journey from Nicholayevsk to St. Petersburg, on a leave of six months only, to visit his family. He left Nicholayevsk by a steamer, drawing 4 feet, for Aigun. Thence by a steamer, drawing 2 feet, to the Shelka River, to Nertchensk or Stroytinsk, where his journey by steamer ceased. Thence he journeyed by the Lake Baikal to Irkutsk, where he awaited good sailing. Thence by road and rail to St. Petersburg. The cost of the journey there and back was about 1000 rubles, or 16 $\frac{1}{2}$ sterling. Having limited means, he exercised strict economy. There are pecuniary advantages, it appears connected with service on the Amur and east coast of Manchuria. He mentioned double pay. Service for ten years secures a pension in rubles, amounting to about 120*l.* per annum, which is doubled for every further ten years' service. Starting from Nicholayevsk in September, the journey can be accomplished to Irkutsk in one month, and from the latter place to St. Petersburg in twenty-five days. This is of course by continuous travelling, say in round numbers a distance of 8000 miles.

Chita, a town on the Ingoda, in the spring of the year may be considered the head of the navigation of the Amur. It is 2260 miles from Nicholayevsk. At other seasons it stops 250 miles short of Chita, at Stroytinsk, which is 730 miles from Irkutsk. The steamer ascends in thirty days and descends in twenty days. Those who have a fancy for a boat journey, it seems, can ascend to the head of navigation in one hundred days and descend in fifty. Telegraphic communication is established between St. Petersburg, through Kabarovka to Nicholayevsk. From Kabarovka the line is in such a state of completion, that it may be expected to reach Novopetrovski in two or three months. These progressive changes are due to the enlightened policy and quick sagacity of General Mouraviev, the late Governor-General and Commander-in-Chief of Eastern Siberia. For his wonderful success in carrying out the encroaching policy of Russia on the Amur, and its important tributary the Ussuri, and his steady but rapid acquisition of the seaboard to the Tu-men, he has well deserved the gratitude of his country. By a peaceful triumph of the pen and a high order of diplomatic intelligence, he has well earned the recognition of his Emperor, in his title of Count Amurski, his membership of the Council of State, his grand cross of the order of St. Vladimir, and his pension of 10,000 roubles (1600*l.*)

A notice of Vladivostock would be very imperfect without a passing reference to its neighbouring lines of communication

on the Suifu River in Guirin Gulf, the head-waters of the Ussuri, and Khanka Lake, with the interior of Russian and Chinese Manchuria. The *Kamurod*, a large-sized Russian gunboat, recently arrived at Hakodati, after a visit, with the Governor-General of Eastern Siberia, to the southern ports recently visited by the *Scylla*. She had left the Governor-General at Wladivostok. His intention was to return to Nikolayevsk via the Suifu, Lifu, Lake Khanka, and the Sungarian or western branch of the Ussuri. This selection of Wladivostok as his port of debarkation, combined with the information I have received from Russian officers who have travelled over and assisted in the survey of this route, unmistakably mark it as that of the southern ports best suited for in and communication. The Ussuri is next to the Sungari, in Chinese Manchuria, the most considerable tributary which the Amur receives from the south. The exploration by the Russians of this important river first took place in 1858, as a preliminary step to the occupation. Lieutenant Venukhof, its explorer, ascended it nearly to its source, and then crossed the coast range, coming up the Gulf of Tartary, a little north of Port Wladimir. A more exact survey of the whole region, extending between the Ussuri and the sea, and south to the frontiers of Corea, was made in 1859, in pursuance of Art. 9 (on definition of boundaries) of the Treaty of Tientsin (13th June, 1858 ratified at St. Petersburg 10th September, ratifications exchanged 24th April, 1860). Colonel Budogorsky directed this surveying expedition, which worked in three sections, each composed of an officer and two assistants. A map, showing the results of these surveys, has been published by the Russian Topographical office.

It also determined seven astronomical positions east of the Ussuri. The Cossack officer, Darytsanof, explored the Suifu, and its tributary, the Hupia; and Captain Gamof, of the Topographical corps, especially detached on that service from St. Petersburg, furnished nine astronomical positions along the Amur and twenty along the Ussuri and its tributaries up to Lake Khanka. He also ascertained astronomically the altitude of several mountains, and made a valuable collection of plants and animals.

The sources of the Ussuri are in 44° N. latitude, and the development of the river, from its origin to its mouth, is 497 miles. But, to follow the route of General Korsakof: we ascend the navigable portion of the Suifu, we reach the coast range or Likhota-Alin of the Chinese. This range may be considered an offshoot of the Shan-Ain mountains in the south. The crest of the range varies in distance from 25 to 80 miles from the coast. The eastern slope drains into the Gulf of Tartary and

the Japanese Sea; the western into the Ussuri. The rivers entering the sea have but a short course, and are navigable only near the mouth. These mountains attain an elevation of from 4000 to 6000 feet. The southern passes are the only ones of real importance, the others being too long and difficult. A portage intervenes between the navigable portion of the Suifu and that of the Lofu. Descending the latter, which has now or is shortly to have a small steamer plying upon it, we arrive at Lake Khanka. This lake extends between 44° 36' and 45° N. latitude, and is about 60 miles long by 40 wide. The north-east and north-west shores of the lake are level, and swampy tracts extend at the mouth of the rivulets which enter it, and of which the Lofu is the largest. The lake abounds in fish. Its oddest fish is the "Huam-yu," unknown in Europe. We are indebted for a knowledge of its existence to the Roman Catholic missionary, De la Bruinere, slaughtered by the Gilyaks on his arrival at the mouth of the Amur. He tells us that he has seen them of 1000 lbs., and had heard of others weighing from 1800 to 2000 lbs. "White, tender, and entirely cartilaginous, with the exception of three small bones on the neck; it has lips formed like those of a shark, the upper protruding much over the lower. Like the shark, it turns itself to seize its prey or bite the hook, and, like it, swims slowly and clumsily. The cartilage and bones are the most esteemed portion of the fish, and sold at Lamsin (on the 'Sungari') for one and a half taels of silver per lb. The mandarins annually lay in a supply for the Emperor's table."

The mountains near the lake are rich in gum. About ten villages are dispersed along the shore, and among the inhabitants are five Gili families, the southernmost representatives of this tribe. A sandy strip of low land separates Khanka Lake from the smaller Dabuka Lake, lying within the same basin. Roads lead hence to Nangum, Giren, Hung-Ch'ien, and to a town (unknown to my topographical friend, Colonel Budichtchef) called Furdan, on the Suifu. M. Butzow, his Imperial Russian Majesty's Consul and Diplomatic Agent at Hakodate, was on Muraviev's staff; and one of a party that accompanied Admiral Kazakavich to Lake Khanka in the small steamer *Mecanie*, 15-horse-power. She was built at Nikolayevsk, the machinery having been made at Petrovsk, on the west slope of the Yabloni mountains. She had run aground in the Ussuri in the previous year. It was on the occasion of meeting the Chinese Boundary Commissioners by appointment at Lake Khanka on the 30th May, 1861. She numbered amongst her passengers Colonel Budogorski and his forty-five Cossacks. The whole

course of the Ussuri and the shores of Lake Khinka have ever since been occupied by Cossack stations.

The eastern branch of the Ussuri (or Sundugui) being hemmed in by mountains on both banks, and having a very rapid course, does not present equal facilities for steam communication. A tributary of this branch, the Hobikhui, is remarkable on account of gold being found along its course. The Chinese obtain gold here, which they smuggle into and sell in China and Corea, unknown to the mandarins at Hong Chien, the frontier town. In addition to the ordinary jealousy shown by the Peking Government at any attempt to explore for precious metals, they have the absurd idea that it is indecorous to disturb the earth upon which were born the celebrated ancestors of the reigning dynasty. The fact, however, that the Chinese find the gold in the river, and not in mines, would it is to be feared, be a vain plea should they ever entrust their golden acquisitions to the rapacious scrutiny of the Chinese Custom-house officials at Hong-chien. Below the "Vozgo," another eastern tributary, the mountains disappear on the left and approach the right of the Sungachuan. After the "Maren" joins the latter the river becomes very tortuous. Though it is not very wide it carries a large body of water, and, flowing in one bed, offers no obstacles to navigation. The formation of small inlets and creeks is peculiar to this part of the river. The average breadth of the Ussuri is here 230 yards, at times only 160; but the depth from the low-water level is from 7 to 9 feet. The country between the Sungachuan and Kuber-Khan is, in most cases, well adapted for settlements. Low hills are scattered over the plain, and in the neighbourhood of the Kuber-Khan high hills approach close to the banks of the Ussuri. They are wooded with oak, and would well repay gardening and agriculture. In the forests vines and walnuts abound. Counters have not as yet been met with. Up to this point or section of the Upper Ussuri, of which Vladivostok may be called the natural outlet or port seaward, the agricultural prospects of settlers are somewhat encouraging. There are, however, two very important drawbacks, viz. scarcity of population to supply labour, severity and duration of the winter season. Verinkoff, the Russian explorer, and others, gave as 1400 most estimate of the whole population on the Ussuri, of whom about 100 are on the left bank or China side of the river. The vast tract extending between the Ussuri and the sea-coast, from Castrics Bay, on the north, to the frontier of Corea, is very thinly populated and it is only in the south, where there are several Chinese settlements, that the population is compar-

tively numerous. A fair estimate of the population of the whole coast region may be set down at 2500.

The severity of the winter season on the Upper Usuri, although a great, is not an insuperable obstacle to agricultural pursuits. The same, or but slightly ameliorated, climatic conditions afford profitable results to our agricultural settlers in the British North-American possessions. The flattening aspect of the summer vegetation we beheld on the neighbouring coast must not, however, lead us to ignore the attemperation and endurance necessary to the winter resident in these latitudes. Mr. Maximowicz has made some meteorological observations on the Upper Usuri at Bussara, 6 miles below the Sungachan, of which the following is a *résumé* :—

"In the sun it thawed from the middle of March, and the snow disappeared in many parts; but only on the 20th of that month did the maximum thermometer rise above freezing point in the shade. During the night's severe frosts occurred until the 1st of April. The river opened on the 10th of April, and the last frost observed during the night occurred on the 10th of May. On the latter day, the temperature at night was unusually very high. On the 30th. March, for instance, 56° Fähr; on the 17th. April, 74°; and on the 14th May, above 80° in the shade. The last snow fell on the 6th of May, the first rain on the 28th of April."

The present defences of Wladivostock comprise a detachment of 300 to 400 soldiers, 30 or 40 sailors, and 10 field-pieces, with the necessary horses. From each of the stations soldiers are detached, during the summer months, for work on the roads and the telegraph line. *Sou-giang* canoes drawn up on the beach represented the commercial aspirations of the port. They had recently deposited their store of "Cotton," seaweed of a brown rusty colour, about seven feet long, and done up in compact bundles; also of "*bêche-de-mer*," strung on sticks. These were to form part of the cargo of the *Alexandria* (a schooner that we had left behind us in the outer harbour of Possietto) doing a quiet trade between the Suantung promontory and this coast.

NAKHODKA.

On Monday, the 30th July, it was our intention to have left Wladivostock (Port May) at daylight, but one of the dense fogs, which during the summer rarely seriously interfere with the navigation of the coast of Tartary, prevented our leaving at the hour we had proposed. At about twelve o'clock, however, the fog lifted, and enabled us, with little farther interruption, to anchor for the night off the west side of the island of Putiatan (Forayth). This island, in one of the many beautiful bays which indent this part of the coast, forms with the latter

a crescent-shaped or semi-circular harbour, where deep water and the protection of hills gave us every possible security. At daybreak of the 31st we steamed out and reached Naidedika Bay, a distance of about 30 miles, at about 10:30 A.M. Here we landed our Russian fellow traveller, M. Budichtel, a topographical engineer officer in the Russian service, who was returning to his duties here after a short absence at Wladivostok, where he had been to consult the regimental surgeon. His solitary black-house was seen at the head of the bay, the only sign, with the exception of a Chinese Manchú fishing-boat, of human habitation. The situation, or rather that of its immediate neighbourhood, was worthy of a higher effort of human art. Nature in her happiest moments could scarcely have conceived a fairer creation of scenic beauty, and seems in this beautiful harbour to have suggested the idea, or modelled the plan of the artistic park-scenery of our best landscape gardeners. Caiswicks and Bleanheims, in all but local wealth, architectural effect, and historic association, seemed scattered broadcast over the diversified scene of hill and dale around. Not "the horn of the hunter," but the matchlock of the Tartar was heard in the glen in chase of the deer; a hind-quarter of one of which, full of flavour and tenderness, lent an extra charm to our visit. To a sportsman it is easy to suppose that time might be pleasantly occupied here. The four Russian soldiers, the hut companions of our friend the topographer, have spent three years here, and are so pre-possessed with the place that they have sought an extension of residence. Our friend, speaking of his soldier companions, mentioned as a singular mark of good fortune that only one of the three was "*veroyne*." What the future of such a scene may be, must depend upon the resources which the vast Government of Russia may be able to apply to its colonisation. With settlers, the opportunities of an accession of agricultural and mineral wealth are undoubtedly great, but in the absence of labour one can but hope and admire. The half-dozen Manchús, or vagrant Chinese, the lords of the untold acres of pasture and wood land around, have an abundance of fish and game to satisfy their necessary wants. Our dollars failed to secure some eggs, fowl, venison, dried fish, &c., that a boat brought off to the ship. Our already well supplied order, enabled us, however, to dispense with them. We were rather amused to find the native intelligence fully alive to the commercial interchangeable value of the ubiquitous dollar, and the Shanghai market quotations for sea-weed, beeches-desert, dried fish, &c. Itinerant Chinese traders periodically visit the place for the purchase of the latter commodities, or their exchange for native luxuries and wants.

It is strange that with cows, and an abundance of milk, in a decidedly pastoral country like Eastern Siberia, butter should not be made in the province. The Russian peasant's ignorance of the profitable treatment of cattle, and his general unwillingness to depart from the rude and wretched makeshifts of his forefathers, thus deprive his countrymen of one of their most coveted luxuries.

It may be important to remember that the harbour of Nakhodka is frozen over for six weeks, and that the golden visions of July must not be expected to be realised throughout the year.

OLGA BAY (PORT SIR M. SKYMOOR).

On Saturday, the 14th of August, we steamed to the outer harbour of Olga Bay, after spending four days under sail on our passage from Nakhodka Harbour, a distance of about 120 miles.

This is another of the many beautiful harbours that fringe the coast of Russian Manchuria. It is formed of an outer and inner, or as it is called the "carceting" harbour, within which lies the settlement. The outer harbour is said to be open throughout the year. It is open to the southward, but is otherwise sheltered by a circle of gently sloping hills, thinly wooded with oaks, maples, birch, ash, aspens, and occasional willows, which, compared with the forest-trees of the more southern harbours, bear a stunted appearance, hereby indicating an increased severity of the climate. The minimum thermometer gives 20° Fahr., whereas at Vladivostock it is -10° Fahr., and at Possietto -5° Fahr., according to local accounts. The inner or carceting harbour is perfectly landlocked; and as it receives from its head the contents of a small river, is closed by the ice for four months. The hull of one solitary brig was the only outward indication of commerce. At the landing-place is a wooden jetty. At the land end are a couple of clock-house stores, some scales and weights. A ragged sailor, with a rusty musket and bayonet, made a very unimilitary attempt at a salute as we landed. The guard here is limited to thirteen sailors; and the commandant expressed his regret that the want of a boat and boat's crew prevented his returning our official call of the morning.

The station of Olga Bay does not evince the slightest military proclivity. It is true that there is a commandant, a naval lieutenant, a second lieutenant, and a doctor, in whose hands it is presumed, lies the administration of Russian rule; but in reality they merely constitute a superintendence over a colony of 300 emigrants, peaceful, unimaginative Finnish or Lappish

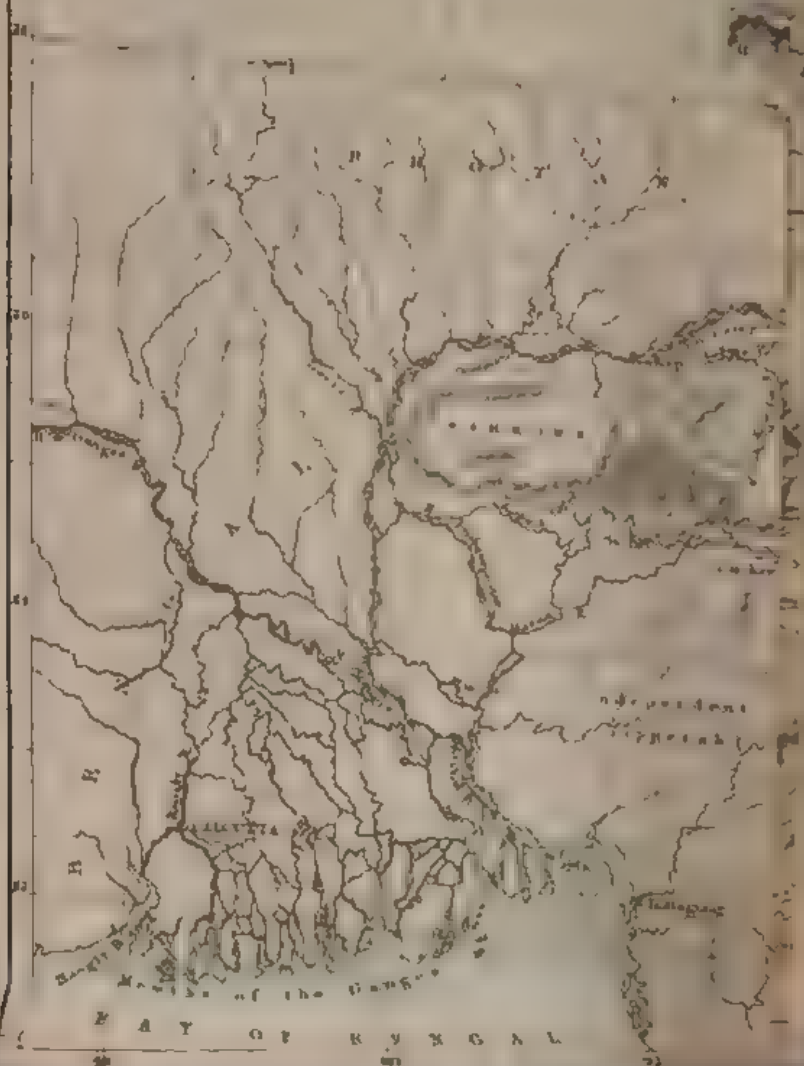
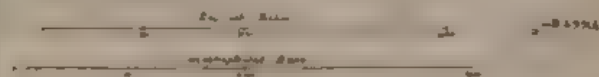
peasants, their wives, and children. The *Manjur*, the transport that brought them to their future home, was at Shanghai in December, 1863. The colony is therefore a young one. They are located in four small villages, at the respective distances of 1, 4, 7, and 10 *vershs* from the bay. Now we visited, and we have everything to say in commendation of the fore-sight and care of the paternal government of Russia, and of its desire to settle its newly acquired territory in eastern Manchuria. I think that it has already been remarked that the Government supplies the emigrant with house, land, food, clothing, cattle, seed, farming utensils, and last, but not least, with religious teaching and medical treatment. These substantial provisions are made for the first two years; and, should unforeseen circumstances disappoint the aim of liberal intention, the emigrant is not permitted to want the necessaries of life. A broad roadway was lined with twenty substantially-built log-houses, with arched roofs and glass windows. Comely matrons, in the costume of the Baltic shores, flaxen-haired children—the wonder, and perhaps envy, of the dusky little Tungusians around them—ran out to the doors, or peeped through the windows as we passed by. Cows of superior breed, fat-tailed sheep, pigs, horses, poultry, surrounded their dwellings. Small garden-plots, surrounded by a protecting fence of cleit ash, larch, or oak, were remarkable for their red and white poppies, beds of sweet peas in blossom. Good potatoes, cabbages, and ordinary English vegetables seemed to thrive very well. The situation seemed admirably selected, on the gently sloping incline to the river at the head of the bay. In fact, the enterprising settler has little to mar his prospects of success, but such as are incidental to a long winter, and no more of this than the Lower Canadian farmer has to contend with. Instead of dense forest and the labours of the woodman's axe before settlements can be cropped, we have here open plains and sparsely wooded slopes, so thinly wooded that no man could lie there under the ordinary spring sun and mid-day temperature of this latitude. About fifty or sixty acres of arable land, totally disproportionate to the industrial capabilities and wants of the number of settlers, were indifferently cropped with rye, barley, or bearded wheat, oats, buck-wheat, and potatoes. On primeval soil, decidedly rich, better results might be expected; but the Russian farmer appears a slow creature, and devoid of industry. Old customs, drunken bouts, primitive usages, clumsy inefficient implements, and the weakness of a rank soil stop the way of all agricultural improvement. We visited a Chinese farm, or fenced enclosure of about a dozen acres, with similar, but certainly better cultivated, crops. These wonderful, ubiquitous Chinese may not govern, but they contrive to possess anything



10/10/10

Sketch Map of
NORTH EASTERN INDIA.
 with portions of
BERMAH & CHINA.

to accompany the Paper by Lord Curzon & others, A.D.



worth having in the country of their conquerors. The Manchus may govern China; but the Chinese own Manchuria, and the thorough-bred Manchu, the ancient lord of the soil, has been successfully crowded out of his patrimony. There remain but his rank and privileges of birthright, declined by the practical Chinaman which consist in serving the Emperor either war in the fortified cities of the empire, or amidst the eight banners beyond the Great Wall. A nomadic Manchu, Tartar Lord, south of the Amur, would be an ethnological prize.

Purchases were made of sheep at nine dollars apiece, fowls three for a dollar; eggs and milk seemed abundant.

Communication with the Coast is not an easy matter at Olga Bay. The commandant mentioned Beasern, six miles below Lake Khinka, on the Sungachan, as the nearest convenient point on the Ussuri. The journey hence takes 20 days. The Gilbert river affords 70 versts (46 miles) of water communication in canoes, but horseback is considered preferable.

Our country walk along the so-called military road, pleasant enough in July or August, must be a veritable "slough of despond" for the involuntary traveller after the spring-thaws of March and April. The road is certainly cleared of trees, and has a certain direction and breadth assigned it by our friend the topographical engineer; but Nature alone attends to the contingencies of repair. What her laws forbid her to do in road-repairs at spring time, her bounty makes up for in advanced summer. The fields here are one blooming surface of wild flowers of many varieties and hue. The air is laden with the perfume of the wild clematis and wild rose. Though the eye be gladdened by the most brilliant colouring, still the general aspect of Olga Bay is, even at this, its most favourable season, saddening. Denied its military, and only hopeful of its commercial character, we are forced to accord it the condition or status given by a Frenchman to his own commercial settlement under military supervision, Saigon, as a port "waiting for commerce."

XII.—On a Communication between India and China by the Line of the Burhampootee and Yang-tze. By General SIR ARTHUR COTTON, R.E.

Read, June 24, 1867.

THE subject of a communication between our provinces in Burmah and the south-western part of China, which has been talked of for many years, has lately again been the subject of correspondence between the India Office and the Government

of India, which correspondence has now been printed for the House of Commons. From this it appears that though there seems to be no intention of carrying out the design, and it is strongly objected to by some of the writers of these papers, yet orders have been issued to examine the size of country in Lower Burmah, or Pegu and as far as our own north-west frontier in the direction of the Chinese province of Yunnan, but not in the part of Burmah proper which lies between these.

It seems very strange that such a question as an internal communication between India and China, if it were raised at all should be treated by all the writers in such a partial and imperfect way. This scheme has originated from persons connected with one particular province of India, and, as might consequently be supposed, it is treated by them entirely as a local question.

To the Rangoon merchant, of course, it was simply the question of how he could increase the trade of that port by making it the outlet of the trade of south-west China, and even to the local official it was necessarily also a question of increasing the prosperity of that province. But, when the question came before the Government of India, surely it should have been treated in a very different way. The real questions were, first, What is the importance of connecting India with China by a direct internal communication? and secondly, What would be the best line for such a communication with reference to the whole of India and the Imperial interests generally?

In the printed papers there is little attempt, in any of them, to examine either of these fundamental points; yet till they are examined, all such partial discussion is only waste of time, and might lead to immense waste of money. Some years ago, when this matter was before our discussion, I wrote a short memorandum on the subject, and took the liberty of forwarding it to the Secretary of State, who transmitted it to Calcutta; but no reply was sent to me. There was, I believe, some little discussion on the point I had suggested, but, as usual, nothing was done.

The first question which I have raised—viz., What is the importance of a direct inland communication between India and China?—seems to require very little consideration to satisfy us that it is certainly a matter the results of which would be great, far beyond all calculation. The throwing open of all India to all China, the access of a country containing 200 millions to the produce of a country occupied by 400 millions, and the opposite, (to say nothing of Central Asia), would be of itself a work of such magnitude as that nothing approaching to it has ever yet been seen in the world, and the export of a large portion of the

produce of Western China for Europe through our own principal port of Calcutta is an imperial question of the very first importance.

And even as respects the trade between China and Russia, the distance from Nankin to St. Petersburg is 5000 miles, almost all land-carriage, while the distance from the Indus to the Caspian is 1200 miles, so that on the line of India there would be water-carriage between those two places, with the exception of at most 1000 miles, and perhaps much less.

But perhaps the great point of all in this question is, that by this means we should have independent access to that country by a line on which there could be no interference on the part of other European or of American nations, by which we are so continually hampered in our access by sea. In case of war, the difference between having to guard our trade to the coast of China and to Calcutta would be incalculable, and I suppose at such a time our whole trade with China would be carried on through Calcutta.

What the traffic would become if the vast system of water-communication in India could be connected by a sufficiently cheap carriage with that of China it is impossible to estimate; but it would certainly be far beyond anything that has yet been seen, and would provide for a capital that would accomplish anything on this short distance of 250 miles between the two rivers.

It seems to me that these few words are quite sufficient to satisfy us of the vast importance of such a work.

The next question surely is not, Can a railway be laid from Rangoon to Yunnan? but What is the best line by which a communication can be established between the two countries? There are three conclusive objections to the connection with Rangoon:—1st. That to lead the traffic to an insignificant port like that, if it can be conducted to the great port of India and the seat of Government, is obviously out of the question. 2nd. It would not connect the great body of India with China, but only an insignificant province containing 2 millions of people. 3rd. It is 900 miles from Rangoon to the Yang-tze, almost all of which would probably be land-carriage; and it is, of course, essential to reach water-carriage in China, by which all the great traffic of the country is carried on. Without this, only a trifling traffic with the thinly-populated province of Yunnan can be carried on, for nothing of any consequence can bear 1000 miles of land-carriage.

The moment we ask the true question, What is the best line for internal communication between India and China? it is answered—that is, so far as what is desirable goes.—and that is,

the line from the navigable part of the Burhampooter to that of the Yang-tze, a distance of probably under 200 miles. Indeed, in one place, according to the maps, it is only 80 miles from the one to the other, at points to which it is highly probable that both rivers are navigable; but it seems to be ascertained that there is very high ground between these points.

The Burhampooter has been navigated to the great bend near Sudyah, and the Yang-tze to probably within 200 miles of the nearest point to that, or about 1500 miles from the sea. Surely, there cannot be the smallest question about this being the line, unless it should be found to be absolutely impracticable, of which there is not the smallest probability.

1st. It is the shortest line between the heart of China and that of India, and also of the port of Calcutta. 2nd. It is the shortest line between the two systems of water-transit. 3rd. It does not pass through the heart of Burmah, or any other great foreign state, but only through small dependent or independent states, through which the objections to transit would be far less.

I need not here enlarge much upon the absolute necessity of water-carriage in order to make accessible the produce of any large extent of country; not 1 per cent. of what would be conveyed by water can bear the cost of thousands of miles of land-carriage. When we come to more than 100 miles, railway and all other modes of land-carriage entirely fail. They were lately carrying cotton from the north-west to Calcutta at 19*l.* a ton, and from thence to London, fifteen times as far, for 3*l.* Even valuable articles like cotton, worth 100*l.* a ton, cannot bear such a charge permanent *v.* What becomes of the great mass of produce, worth from 5*l.* to 20*l.* a ton? They are either carried by water or not at all.

In France they are now revising the whole system of water-transit, improving and completing it throughout the whole length and breadth of the country; because they find they cannot compete with other countries while they are even partially dependent upon land carriage.

The same in the United States. A report by a Commissioner has lately been laid before the Government on this subject, showing the absolute necessity of the most extensive improvements of their already magnificent water-communications. He says, "*To do away with the enormous cost of all rail transportation across the continent, it is proposed to make a communication of navigable water from the Ohio River,*" &c. &c. And some of the projects now under consideration are, to improve the whole line of the Mississippi from the highest point practicable to the sea, to make a ship-canal from the Lakes to the

Mississippi; another ship-canal round the Falls of Niagara; to enlarge again the Erie Canal from the Lakes to New York, upon which they have only just expended several millions in enlarging it, &c. &c.

All this is going on in these countries in the face of the most complete system of double railways, showing that after many years' trial, they have been proved totally to fail to carry the great traffic of the country at practicable rates.

So it is in England even, short as the distances are here. The great traffic of the country is still carried by water, by the coast, rivers and canals, utterly imperfect as the internal water-communication is, are not even fitted for steam power. Several of these miserably imperfect rivers and canals carry more than a million tons a year, with double railways running by the side of them; animal or human power on water completely beating steam power on land, after spending 30,000*l.* or 40,000*l.* a mile on the railway, while 100*l.* or 300*l.* only has been spent on the navigation line.

Nothing therefore can be more certain than that the one point of paramount importance in this case is to find the shortest practicable line of land carriage; and it is most remarkable that this line is the very one that meets the other requirements, if it is at all practicable. On the one side we have water-transit from Kurra-choe, 3000 miles to Sud ya, with only one interval of 150 miles between the Sutlej and the Jumna, of the easiest possible country, for which a canal has already been planned and estimated, and which would cost, perhaps, 300,000*l.*; and on the other several thousand miles of river and canal connected, of which one continuous line by the Yang-tze, 1700 miles, the Grand Canal 100 miles, and probably 1800 miles of the Yellow River, is in all 3600 miles. So that this one line of 7000 miles, from Kurra-choe into the heart of Chinese Tartary, is only broken by two intervals, one of which we know can be overcome at a cost quite trifling. There is, indeed, little hope of water-transit being established on the other interval of 200 or 250 miles, from what we know of the country; and this is undoubtedly a very great pity. But even a land carriage which would connect such vast extents of water-line, and such enormous populations, must be of incalculable value, and will certainly justify ultimately any possible expenditure.

The question then remains, What do we know of this tract of country?

On the Indian side we have the published sheet of the Indian Atlas, No. 138, compiled from the investigations of the officers of Government sent to explore it during the first Burmese war, as far as the Irrawaddy, with their reports, and also the reports

of Burmese merchants, who now trade between the two rivers, the Irrawady and Barhampootee. The former proceeded by water to $95^{\circ} 30'$, within 200 miles of the Yang-tze, as it is laid down in the maps, and thence by land to the Irrawady, but on the line they passed over they crossed very high land. Their expedition terminated at the Irrawady, just 100 miles from the Yang-tze.

The Burmese merchants are reported to travel by a road south of their line, and to state that there is no serious obstruction of any kind as far as the Irrawady, but what height they pass over I have not heard. Between the Irrawady and Yang-tze I have no information, excepting what the published maps give, which appear to be all copied from the Jesuits' map of China.

Whether the latitudes and longitudes are there correctly given I have no information, and I think no European has visited that tract in modern times. The gentlemen who navigated the Yang-tze proceeded to within about 200 miles of the nearest point of that river to the Irrawady, and they ascertained that it was navigable beyond that.

According to the maps the line from the Irrawady to the Yang-tze is across the lay of the country, and the Yang-tze and Mekon are represented as divided by mountains; but whether this is correct, or whether there are any steppes or passes through those mountains does not appear. In the course of my engineering experience so many supposed insuperable obstacles have vanished as soon as they were looked into, that I am always reminded not to be deterred by one till I have ascertained that it really exists.

Thus we are not certain that portions of this line may not be practicable for water-ways, nor what the precise distance really is. The first thing to be done, therefore, is to examine this line of country. It would be advisable to do it from both sides, on the Indian side following the route of the Burmese merchants to the Irrawady, and so on to the eastward; and on the China side steaming up the Yang-tze as high as practicable, and then proceeding by land to the westward.

The late navigators of the Yang-tze saw some of the chiefs of the tribes inhabiting the intermediate country (the Maoutsees, as the Chinese call them), and found them extremely friendly, and willing to be visited. They are quite of a distinct race from the Chinese, and probably are of the same as the Karmis north of Burmah. They seem to be a very fine race, in a state very similar to that of the Highlanders of Scotland 200 or 300 years ago. Proceeding thus from both sides it is probable that it would not take long to examine the 100 or 150 miles between the Irrawady and Yang-tze.

It is more than probable that men might be found among the missionaries in Upper Assam and in Burmah who are already so well acquainted with those races that they would understand perfectly how to deal with them, and who would gladly undertake the duty of exploring the line. They might also know so much of the languages spoken as would facilitate the communication with them. A Livingstone might be found among them who could make his way to the moon, if only it were filled with uncivilized people.

Part of the line would, I believe, pass within the frontier of the petty states dependent upon Burmah, and part through similar states altogether independent.

If a small fast steamer, of the smallest draught, were sent up the Yang-tze, it would be an easy matter to go to the highest point navigable, especially as there are coal-mines now worked on the very banks of the river, so that a steamer might proceed without any delay. If a small steamer like those sent out to the Godavary, drawing only 1 foot, and capable of working at 10 or 12 miles an hour, were used, it would be a very speedy voyage to the great bend of that river.

It might also greatly assist the expedition if a similar steamer were sent up the Irrawady. This river is represented in the maps as passing within 100 miles of the Yang-tze; and it is not at all likely that it should not be navigable for very shallow steamers in June, when the snow is melting. On May 24th the expedition found the Irrawady in 27½ North latitude "fordable," so that it must have been navigable thereabouts in that month; for the ford would of course be chosen where the river was shallowest, and "fordable" would hardly mean less than 2 or 3 feet of water there. So also a vessel might be sent up the Mekong or Cambojee, one of the affluents of which is represented as flowing from a large lake 40 miles long, and within 20 miles of the Yang-tze.

It is thus evident that upon examination the actual distance in which land-carriage may be found unavoidable may be very small. And it is almost certain that the distances between points to which small steamers may be run when the snow is melting are very short indeed; viz., from the Burmahpooter to the Irrawady 100 miles, thence to the Salween 50, thence to the Mekong 25, and thence to the Yang-tze 25, so that land parties supported by steamers would have very little difficulty excepting such as might arise from the inhabitants; and we have every reason to believe they would be friendly if the expeditions were under the charge of missionaries who were accustomed to those races, and would know how to deal with them. Two or three small steamers, just large enough to carry exploring parties,

would not cost more than 2000*l.*, and this would probably be the cheapest way of conducting the expedition, as well as the safest.*

With respect to the mode of opening the communication, the main points to be kept in view seem to be—

1st. To open the line, in however rough a way at first, as speedily as possible.

2nd. To do it in an inexpensive way at first, connecting the line and perfecting the communication by degrees.

3rd. To have as little work on the spot as possible.

4th. To establish ports at different points, in which suitable persons might reside, to communicate with the different native authorities, &c.

5th. To establish light steamers on the different rivers, to carry materials, stores, provisions, &c., while the line is being established.

The great point seems to be to carry on the work so as to be as little dependent as possible on local labour. For this purpose there seems nothing like a very narrow-gauge railway, such as is in operation in the vale of Festinog in Wales, which is only 2 or 3 feet gauge, and yet it is even worked with locomotives. Such a railway could be laid with extremely little labour on the spot, and could be finished in a very short time if the materials could be conveyed by water to three or four points on the line. It would of course be laid with very sharp slopes and curves in the first instance if necessary.

There would be many advantages in proceeding in this way, especially as so little expense would be incurred in preparing the ground, that the line might be altered at any time, as the country was more fully explored, without any great loss, the time required would be greatly reduced, &c.

The total first cost of such a line would be very moderate. If timber could be obtained on the spot, or conveyed by water from the banks of the different rivers, continuous sleepers, with square iron trams of only 1½-foot gauge on the same timbers, might be laid down in the first instance, to be worked by horses or bullocks walking by the side of the rails. A perfectly effective railway, of only 2-foot gauge, was laid at the Godavery works for the carriage of stone, which cost 200*l.* or 300*l.* a mile; and this would be of great use to initiate such a line of road while more complete works were in hand, so that by the time

* I cannot find any information respecting this line. Capt. Sprye and others have furnished information respecting a mere junction line from Haipoen to Yunnan, but the line I speak of from the great bend of the Yang-tze, in lat 26° and long. 104°, in the direction of Suifu on the Boshampootet, as far as the Irrawaddy, seems to be totally unknown.

the latter were ready for the traffic, the traffic, having been in the mean time diverted into this line, would be ready for the railway.

Of course it would be of the greatest importance to make water-communication as far as the line could possibly admit of it.

I should add that a new importance is given to this line of communication at this time by the ten speculations in Upper Amsu. It seems to be fully ascertained that that province is of extraordinary fertility, and that nothing is wanted but labour to make it one of the finest fields for the employment of British capital and energy that could be found. If only access could be given to it from China direct, there can hardly be a doubt that any amount of labour could be obtained.

XIII.—*Notes of a Journey in the North-West Neighbourhood of Peking.* By JONES LAMPREY, Esq., M.B., 67th Regt., V.R.O.S.

Read, June 24, 1867.

It was not till the autumn of the year after the signing of the Treaty of Peace in 1860, that the northern provinces of China were fairly opened to the excursion-loving Englishman. This delay was a wise and necessary precaution under the peculiar circumstances of our being so recently at war with the people, and our military occupation of an important city inhabited by a race who are characterised by self-conceit and a feeling of superiority over all foreigners. It was well, before going among such a people for the first time, that they should have some report of us, and that they should know that we were not the untamable savages we were hitherto supposed to be.

During our occupation of Tien-tsin, it was interesting to observe the change that took place in the dispositions of the inhabitants towards us, and how completely distrust gave place to confidence. After a few months' residence among them, they soon saw that though conquered they were not oppressed, and that, though there was a force of about three thousand foreign soldiers quartered among them, they were amenable to law and order, and that justice, administered in matters in which they were parties, was as fair to them as to ourselves; they were paid well for anything we purchased from them or when they worked for us; we relieved their destitute poor, and established a hospital for their sick, all which circumstances being noticed by a peculiarly observant people, did not fail to spread our reputation throughout the northern provinces and secure that

respect and civility which the excursionists met with wherever they travelled.

The restrictions to travelling were removed gradually. At first a party consisting of two or three were allowed permission to visit Peking for a few days, where they were sure of enjoying the hospitality of the Embassy. On their return others obtained the same privilege. Subsequently these visits were extended to the Great Wall. One party, more venturesome, made the attempt to explore further inland, and succeeded in seeing much of novel interest, without meeting any unpleasant adventure; and, by the spring of the year 1862, the excursions were extended into Manchuria, Mongolia, Shansi, and Shantung, so that by this time the northern provinces have been pretty freely traversed.

Of the different routes taken at first it is difficult to say which was the most interesting. One led to Mukden, the ancient capital of the Manchus. Another to Jehol, a royal residence made famous by Lord McCartney's expedition. Another to the humble but hospitable tents of the Mongolians and their flocks. Another through the bold and picturesque mountain passes of Shansi, while the level plain of Pecheu was not without its interest, though no doubt Shantung possessed the most interesting of all objects—the tomb of Confucius and the family residence of his living descendants. Thus the traveller, who has already exhausted the west of Asia, can now turn to the further east, where he will find a most interesting and in some respects a comparatively unexplored country.

The facilities for travelling in the north of China are abundant: the country is everywhere traversed by tolerable roads; there are excellent Tartar ponies with the best of reputations for strength and endurance; also the ordinary country mule-carts, and innumerable inns, though there is occasionally no small discomfort to be encountered in being at times obliged to rely on the food of the people dressed after their own fashion, and the inferiority of inns sometimes met with in remote places.

To enjoy an excursion into the interior to the best advantage much depends on the season of the year. In the autumn the weather is sufficiently cool to make travelling pleasant, till towards the middle of the month of November, when a sudden fall of temperature to freezing point makes the nights sufficiently cold and disagreeable. Still excursions have been made in mid-winter with a temperature not far from zero, and occasionally many degrees below it, but it requires the hardening of a previous winter to make an excursion at this particular season either safe or agreeable. By far the pleasantest time is the spring, in the months of March, April, May, and a portion of

June, when the landscape puts on a most refreshing green appearance, and the innumerable flowering plants and trees of the country deck themselves with their gayest blossoms and verdure.

The appearance of a party starting on one of these excursions was somewhat picturesque; the country carts, mule drivers, and Chinese servants, gave it a peculiar character, while the costume of the Europeans, though much modified by furs, &c., was sufficiently national to excite the amusement of the people wherever they were met with. Hats were, of course, completely discarded, and gave place to fur caps or wide-awakes wrapped in pugress; the cloth coats with their numerous pockets, the peculiar cut of the outer garments, and the high leather boots with spurs, were enough to distract the equanimity of any Chinese mind, and would doubtless in many instances equally astonish friends at home.

The cart is the ordinary mode of conveyance, and in the north of China it is stoutly built, has two wheels, and though not made with springs is tolerably free from jolting, owing to the softness of the roads and the easy pace at which it travels, generally at the rate of about twenty miles a day; it is covered in with cloth stretched over a wooden framework made large enough to accommodate one person comfortably with his bed and baggage. Although built after a common pattern, those belonging to the wealthy are fitted up with no ordinary care and neatness, they are yoked to a mule, with untanned leather harness, consisting of a bridle and long driving-reins, a collar to which the traces are attached, a straddle and bands to support the cart, altogether much resembling our own method. A second mule is frequently attached with traces connected with the axle-tree, and kept from tangling by being passed through iron loops fastened on the free ends of the shaft. The driver shows excellent skill in handling his wayward and often stubborn animals with reins and long-handled whip, sits on the shaft near the body of the cart shouting out repeatedly "Ghee! ghee!" or "Who! who!" just as an English ploughman would occasionally converse with his team. However rude they may appear in our eyes, these carts are undoubtedly the prototypes of our cabs and hansom, and were long used in China before they were thought of in Europe. In Peking these carts are to be seen standing in rows in the streets, waiting for casual hire just as car cabs do in London.

Having hired one of these carts, and packed it with what was thought to be necessary for the road, and taken the precaution to send it on the evening previous under the charge of a Chinese servant, so as to get clear of the town, I mounted

my horse, a Persian Arab, which had recently been a troop-horse in one of the Indian cavalry regiments that had been employed in the late campaign, and started at an early hour the following morning, 27th of October, 1861, in company with a guide who rode a Tartar pony. Proceeding through a long line of suburb, crowded at that early hour with people carrying their garden produce to market, we at length emerged into the open country, about two miles distant from the city gate. Leaving the Peking road on the right hand, and following the southern bank of the upper western river, or Shang Shih, for about three miles, we reached the ferry-bout station, where we had no difficulty in passing ourselves and horses across. This river, were it not for its rapid course, flowing eastward, should be more properly speaking, called a canal, owing to its narrowness and the artificial embankment apparent in many places. It formed one of the important tributaries of the Peiho, which it enters close to Tien-tsin, and judging by the numerous long, narrow boats which were being trucked up it, in a manner similar to what one sees on the rivers of Bengal, it must support a very considerable amount of traffic.

Our course lay to the westward, over a flat, uninteresting country, having the same monotonous aspect and cultivated much in the same manner as seen in the vicinity of Tien-tsin. On all sides were fields of millet-stubble, or winter-wheat, beautifully planted in drills, now two or three inches above ground, and occasionally fields of cotton-plant. There was a considerable amount of recently-ploughed land; and now and again villages, surrounded with a few willow trees, were visible in the distance. At length we reached a village larger than usual, called Wang-shing-To, and stopped at an inn to refresh ourselves and horses. This inn was a poor affair, compares with others subsequently met with. In outward appearance it differed little from the wretched shops in the street, except that it had a temporary verandah, constructed of wattles and mud, before the door. On entering the inn, I found a strong odour of oil fizzling in stewpans, into which the cooks were dropping morsels of pork or mutton; other men were busy chopping up vegetables, or kneading dough, or baking cakes in ovens. In short, this was the kitchen of the establishment, through which it was necessary to pass before entering the proper *salon* or *dining-room*. This consisted of a long, low room, lighted at one side by papered windows; several small square tables were arranged at each side, and separated from each other by rickety forms, which were mostly occupied by countrymen apparently of the same class as the mule-driver and servant, judging by their outward appearance. They were all busy with their

morning meal, poking the morsels with the chopsticks out of the bowls held in the left hand. The chopped meat, vegetables, rice, soup, &c., were all served up in small bowls, each combination having a well-known name. The farthest end of the room was provided with a kang, or raised platform, constructed apparently of solid masonry, but having in the body of it a flue, leading in a tortuous manner from a fireplace constructed outside the room, so that when the kang becomes heated it affords a comfortable sleeping-place during the coldest weather. It is also constitutes the bedroom of the establishment. These kangs are in universal use throughout the north of China. We saw them in the Summer Palace, and in every house we occupied during the expedition in the north of China; even the beggars' hovels are provided with them. The kang in this inn was occupied by a party of men, who were engaged drinking tea and smoking pipes; others were fast asleep and stretched out at full length on it.

So soon as the servants and horses had finished their meals we moved on our journey, still to the westward. The road led through a more wooded country; the trees were chiefly willow, of a good old age. The country people gave very little heed as I passed by, being all much engaged in threshing out the millet-corn, or cutting home from the fields the mill-t-stalk, &c. The castor-oil plant appeared to be cultivated to some extent. Still the country continued flat; farther on, however, at a distance of about 25 miles from Tien-tsin, the country became slightly undulatory, and at length our road passed on to an embankment which one would suppose was originally constructed for a railroad. Further on, this embankment had more the appearance of being at one time a sea-cliff, or deep river-bank, having on the southern aspect a declivity of about 50 feet; while on the northern side a small bund separated the sumn it from the country which was on a level with it. On leaving the road, and turning to the north to see more of the upper plateau, I found, at the distance of about a mile, the dry bed of a river, which, I found, was the Hooa-ho, the water of which had been turned into the Shang-shi-ho by means of a dam built across it some distance up its course. During the melting of the snow and ice in the hills where it takes its rise, the water overflows the dam, and boats from the Peiho are able to sail up it for a short time. There were a few boats observed on its banks, but they had all the appearance of being ferry-boats. This river rises in the Shi-shan, and enters the Peiho near Tien-tsin. (On looking over the lower plateau, I noticed several smaller bunds extending some little distance from the embankment, and fancied they had been constructed for the purpose of reclaiming

land or preserving it from an overflow during periods of floods. The aspect of the lower plateau had much the appearance of being a dry bed of a great river several miles in width; the country for that distance to the southward appeared to be arid sand, with insular patches of cultivation and willow plantations. This character was preserved for some miles along the course of the embankment. Could this be one of the original channels of the Yellow River, which tradition and the topographical histories of the Chinese say once flowed, and now is known to flow, into the Gulf of Pechili?

On my return to Tien-tsun the road led more along the course of this embankment, which I found gradually lessened in height till it approached within a few miles of Tien-tsun, where it sloped off to the level of the surrounding country. There was one part of its course I observed to have been recently constructed: it was in a part where the Hoan-sho approached close to it, and burst a way through to the country on the south and did much damage. There was no doubt that it was artificial, but in other places I could get no information from the country people further than "it was always there."

After the sun had set and it became dark, we descended to the lower plateau and entered a village, where we found an inn scarcely worthy of the name. The morning air of the following day felt very chilly, and a dense fog obscured the landscape. Our road led through extensive plantations of dwarf willow, cultivated for making the baskets which are in such general use all through the northern provinces. As the day advanced, the sun shone out through the morning mist, and, after a pleasant ride over undulating ground, through willow-plantations and orchards, we arrived at a village where the guide said he had some relations. I was glad of the opportunity of seeing the interior economy of the houses belonging to his class of the people, and readily consented to stay at the house where he proposed to stop at, intending to move on the following day. The village consisted of about twenty houses, mud-built and one-storied, some of which were tiled, others thatched with straw, and arranged in a straggling manner along the road and shaded mostly with willow-trees. On the opposite side of the road in front of the house where I stayed there was a large space, enclosed by a fence of millet-stalk, forming a farmyard, in which Indian corn, millet-stalk, cotton-stalk, bean and cressatum plants were stacked. In the centre of the yard a hard, even surface was prepared for thrashing the different plants, which is done by different methods. For instance, the beans and cressatum plants are taken up in bundles in the hands and beaten against a standing framework, the Indian-

corn cobs, previously sun-dried on the roofs of the houses, &c., are struck by long sticks by men and women sitting round a heap of the cobs on the ground: the cotton has already been picked by the women and children while the plants were standing in the field; and the millet, whose cobs have been removed from the stalk in the field, is separated by means of a stone roller, not unlike a garden-roller, yoked to a mule or a donkey, and frequently passed over the cobs scattered in a wide circle on the ground. Millet is by far the most universally cultivated crop in the north of China, not only on account of the food it yields for man and cattle, but also from the variety of useful purposes to which every part of the plant is applied. To enumerate them all would be as endless as enumerating the purposes to which the coco-nut palm serves in tropical countries. The stalks vary from 6 to 8 feet in length, and are about an inch in diameter at the base, tapering to half the width at the top. The stem, although jointed, is not hollow as in other cereals, but filled with a light pith: hence they are sufficiently strong for fences, for thatching, and for forming, with a layer of mud, the side-walls of houses for the poor. When split and made flat they are woven into neat-looking mats, used in covering the kang on which the people sleep. The millet-stubble, which remains after the stalks are cut, serves as a tolerable material for fuel. The large quantities of millet-stalk found in the villages of Peking and Taku, afforded no small aid to the military operations of the Russians, in 1860, in constructing batteries, filling up ditches, and making roadways over swampy ground, - uses to which the Chinese never thought they would have been applied.

While staying at this house I had abundant opportunities of examining the farming implements commonly used throughout the north of China, and amongst them I was much struck with the seed-sowing machine in general use. It would be difficult to describe this apparatus without the aid of a model. Their plough is a very simple contrivance. The share resembles a shovel, with a mould-board on the upper surface to turn off the sod: both are made of cast iron, and very simply tied on the wooden frame of the plough. There is no collar required, as the soil is so loose and friable that it would be unnecessary, and the farmer is satisfied with mere surface-ploughing. Sometimes one bullock is sufficient to draw the plough, sometimes a bullock and mule, or donkey or pony are yoked together. The field, when ploughed, is harrowed with a very simple harrow, consisting of a triangular frame of wood, having a number of sharp-pointed iron prongs, about 8 inches in length, projecting on the under side. This harrow is usually yoked to a bullock.

the driver, standing on the upper surface of the frame, gives it weight and makes it hold to the ground; it is drawn over the ploughed field until the clods are broken into a tolerably even surface, and all the roots of the previous crop have been removed. Another harrow is now applied: it is made of strong wattles plaited together; the driver stands on this while a bullock draws it over the field in all directions. These operations effectually pulverise and level the soil; but the Chinese farmer does not rest satisfied with this ploughing and harrowing for the cultivation of the future crop, whatever this may be. As soon as it makes its appearance above ground he commences working the soil about the growing crop with a hoe of a particular shape, and, as he knows that the produce of the crop will be equivalent to the amount of labour bestowed on this work, he is unceasingly employed at it. One great result of this careful tillage is the remarkable absence of anything like a weed in their fields.

In districts remote from large towns or villages the farmers are necessarily but badly supplied with materials for fertilising the land; they are consequently economical of it, and carefully collect it on every opportunity. In land set apart for winter-wheat small quantities of stable manure are harrowed into the soil in the first instance; and while the crop is growing men may be seen, with baskets suspended from their necks, walking up and down the fields scattering in a powdered substance, as if they were feeding some hungry poultry. This is the cake made from the Chinese bean (*Dolichos*), cotton-seed, or cressum, in the process of pressing out the oil. The enormous production and consumption of these substances make them considerable articles of trade throughout China.

The rotation of crops is practised as far as possible, though for successive years millet will be planted in many extensive districts. The periodical floods which inundate the land, by depositing fresh alluvium, may in some measure account for this unusual fertility of the soil. The choice of crops rests with millet, Indian corn, cressum, cotton, pulse (*Dolichos*), tobacco, wheat, barley, and sweet potatoes; and, with such a variety, it requires skill and local experience to determine which is the best for present cultivation.

Beyond the barn-yard, which contained several large ricks of straw and Indian corn-stalks, &c., I found a vegetable garden laid out in neat beds, and well-trimmed side-walks, and containing white cabbage, turnips of three sorts, brinjal (*Solanum melongena*), onions, eschalots, chilies, a few plants of tobacco, a plant or two of sarsaparilla, cucumber, melon, tomatoes, a few plants of the sweet millet (*Sorghum saccharatum*), resembling the

common millet in every respect except that the stalks were taller and more slender, and the seed was of a white colour. A plant or two of Chinese pepper, a grape-vine, several peach-trees, a Chinese date-tree (*Rhamnus*), and some high-growing willows constituted the trees. A balsam or two, a few chrysanthemums in full bloom, a colossal sun-flower, and an uncommonly gorgeous cockscomb were the only approach to what we would call garden flowers.

On the march of the army on Peking, in 1860, large deep pits were frequently met with in the middle of the fields. Some of them had such a formidable appearance, that it was supposed they were intended to entrap the army on their march; however, it was subsequently ascertained that these pits were intended for storing the sweet potatoes during the winter. White cabbage and other vegetables are preserved in a fresh state for four or five months of the winter, by burying them in similar pits, so that vegetables, with all the freshness of being recently taken from the garden, were procurable in the markets of Tien-tain throughout the winter.

I had here the opportunity of learning something about the cultivation and preparation of cotton—one of the principal products of the province, if I may judge by the large area of ground I saw under its cultivation, and the large supplies of it for sale in the various fairs I passed through on my journey. The seed is sown in the second or third moon (May or June), the blossom appears in the sixth moon (August), and about the eighth moon (October) it is fit for gathering. I noticed that the plants were not over 22 inches high, they still showed a large number of pods ungathered, although the harvest was nearly finished. It appears that the low growth is owing to the practice of nipping off the tops of the plants, about the fourth or fifth moon; this has the effect of dwarfing them, and at the same time forces the blossoms. Whether the staple of the cotton is shortened by this process remains to be seen; with much care in the cultivation, a plant will produce from 60 to 80 blossoms and from 50 to 60 pods. I could hardly believe this information correct, but was assured that such was the case. The crop must be gathered in by the ninth moon, as frost destroys the cotton when in the pod.

I also learned that one mow, equal to the fifth part of an acre, yields about 100 katties* of cotton bales or 35 katties of cleaned cotton; each mow of land costs about half a dollar a year, and each katty of clean cotton realises from 17 to 20 cents. The cotton-seed is useful for feeding cattle, and yields a valuable oil and cake, very much used as a manure. The value

* A Katty = 1½ lb. in weight.

of the seed is about $1\frac{1}{2}$ cent, a katty, and taking into consideration that the stalks of the plant, after the crop of cotton has been gathered from it, serve as fuel, the cultivation of cotton is sufficiently remunerative to the farmer. Unfortunately the price of cotton in the north of China is too high to admit of its being exported under ordinary circumstances with profit. The shortness of the staple is objectionable to the cotton-spinner in England, whereas the length of the staple is a matter of indifference to the Chinese, who consume large quantities in padding their garments and manufacturing a narrow hand-spun cloth, of a coarse texture, but very durable; in short, the Chinese are the greatest cotton-consuming people in the world.

Hearing a musical sound resembling the *tan-tom*ing in India, in the next house, I inquired what it meant, and was told that cotton-cleaners were at work. On entering the house, which was readily allowed me to do, I found a man at work with a cotton-bow, similar to that used in India, only of larger and stouter dimensions, corresponding with the superior physique of the Chammun. I also noticed another man working a cotton-gin, by which he was removing the seed from the cotton, the apparatus worked very rapidly and effectually, and was worked with hand and foot. The principle of its construction was simply a contrivance to press the cotton-seed out of the cotton-pod, or bales, by passing them between two rotating closely-pressing horizontal cylinders or rollers; the seed unable to get between the rollers fell to the ground, while the cotton passed to the opposite side. There was a stout string of catgut tightly stretched along the further opening between the two cylinders where the cleaned cotton passed out: but what particular object was attained by this contrivance I could not make out.

It appears that cotton cleansing in the north of China is a separate branch of industry, and those who practise it go about from village to village, carrying their simple apparatus with them, they are generally in couples, one working at the gin, while the other works at the bow.

On making an excursion in the neighbourhood of this house, at the distance of a couple of miles, I came upon the high embankment before alluded to; it seemed to hold the same course to the north-west, and resembled the embankment of a railroad so closely, that it only required the sound of the whistle and the steam in the distance to make the picture less imaginary. Ascending the embankment, I found, not far off, the dry bed of the Hoen-ho, and wandered along its course for some distance in search of shallow pools, where, my guide informed me, wild-fowl were sometimes very abundant. I only succeeded in seeing their foot-prints in the soft mud.

On the plateau below the embankment I observed rather a comfortable-looking village, having a large temple-like building and some brick houses in good repair; my guide informed me that it was inhabited by Manchuans, who were the terror of the country all round, owing to their thievish propensities, especially cattle-lifting; and to secure themselves in some measure from theft, its neighbours subsidised a man of the village, who is usually successful in restoring a lost horse, donkey, or bullock, if the recompense is sufficiently liberal. It was also hinted that this man was in league with the rogues, who altogether wore a more prosperous appearance than what dishonesty usually confers on people in general. Their ostensible occupation consisted in the manufacture of an alkali of considerable mercantile importance. The soil in this particular spot, as in many other localities in the province, is so thoroughly impregnated with natron, that it may be collected to any extent without being exhausted. It appears in the form of a white incrustation on the surface of the ground, like hoar frost; this is swept off the surface of the ground day after day. These sweepings are placed in a large vat with water, and filtered off in the form of a highly-concentrated transparent liquid which is evaporated by being boiled in large cast-iron caldrons, till it is in a fit state to crystallise; it is then poured into wooden boxes or moulds, about $2\frac{1}{2}$ feet long, by $1\frac{1}{2}$ foot wide, and 6 inches deep, so as to make a large block weighing about 1 cwt. It is largely used by the Chinese for cleansing purposes, and forms an item of considerable trade in all the towns of the north.

The presence of a foreigner in the village was soon reported through the neighbourhood, and on my return to my lodging many came to see the *Muen-tse*, as we are commonly designated in the north: this is rather a term of contempt, and implies that we are the same as those rude tribes bordering on China, who are characterised by wearing their hair long.

Amongst those who came to see me were some well-informed, well-to-do people though most of them were of the common rustic class; the latter were well clad, and had all the appearance of a similar class of people in most civilised European countries. They were a healthy-looking robust people, and were very civil in their behaviour. Some of the more intelligent visitors asked me many questions, showing that they were an inquiring people, and would yet learn many things from us to their own future advantage. They evidently see a new era in their history dawning upon them, and expect many changes to take place. All expressed themselves favourably of the English merchants settling at Tien-tsin, and remarked that as it would not now be necessary for their own merchants to go

down to Shanghai to purchase merchandise, such things would be more abundant and cheaper than they were formerly.

Hearing that there was to be a fair this neighbourhood on the morrow, I was induced to delay my departure particularly as it gave me an opportunity of seeing one of the institutions of the country, which had not been before noticed by travellers. This fair happened to be a *Kan-shever-meeen*, meaning a fair where, in addition to the sale and purchase of various commodities, bachelors go to look out for a wife. There are several such fairs held annually throughout this province, and I had subsequently the opportunity of visiting others during my journey.

27th.—The heavy rain prevented us starting in the morning. As it cleared up in the course of the day, though it still threatened to rain, I took my gun and dogs to see what shooting was to be had in the neighbourhood, and only succeeded in bagging a few quail and a large wild goose. I got a few shots at some very fine wild ducks, but they were too wary to let me get near enough. I met with the greatest civility from the country people, and had an opportunity of noting the carts of the country. They were mostly drawn by oxen, and were strong and serviceable, though the wheels were of very primitive form.

28th.—Started for the Shi Shan, or Western Mountains. The morning was very foggy, and we could scarcely see our way clearly over the road-tracks through the fields, there being no hedges or fences of any kind to define our route. Throughout the rural districts a small line of unploughed land, about a foot wide, serves as a boundary, so that the apparent absence of boundaries is a peculiar feature of the landscape of the level country. At length, about 10 o'clock A.M., the sun shone through the dense mist, and the day became bright and warm. Our road took a north-westerly direction, and was at times rather tortuous. After a slow ride through a country thickly covered with plantations of pear, apple, peach, poplar, and other large timber trees, some of which resembled beech all planted in regular rows, the country passed over became more undulating, and now and again opened out into extensive plains, covered with millet-stubble or winter wheat. We passed by two or three large villages surrounded with a mud wall and double ditch, and at length reached Kuna Shan a small walled town. The crenelated wall was beautifully perfect and new looking. It was built after the same model as that of Tientsin. The gates also had much the same appearance, and were placed in the centre of each of the four walls, but the structures over the gates (guard-rooms) were in a wretched tumble-down con-

dition. I entered the western gate, and found no guard present, and the inner gate alone was capable of being shut. On passing into the city, instead of finding a large population and numerous houses and streets, as I expected, only a very small portion in the centre had houses built on it, the remainder was a waste, or covered to a great extent with water, on which flocks of wild duck were seen swimming about. Riding through the main street of the city, I stopped at what appeared to be an inn, seeing some carts and mules in the yard, and the usual sign of such establishments hung up outside. This sign consisted of a bundle of paper, the lower part of which was cut into thin ribbons, and intended to represent pie inion, a sort of macaroni, one of the chief ingredients of Chinamen's food; finding the place so wretched that it had not sufficient food for us, we went on to another inn in the southern suburb of the city, where we had breakfast and baited our animals. It may seem curious, but the best shops and hotels in China are generally found in the suburbs outside the cities.

This town had formerly a ditch round it, but it was filled up with soil, and hence the accumulation of large pools of water within the walls, so that the surface of the country must have undergone great alteration either through floods or dust-storms.

Having baited our animals, and refreshed ourselves with breakfast and some delicious soft pears purchased here, the only ones that at all resembled the European fruit, we met with in the country, we started off in a north-western direction, leaving the western gate of the city on our right hand. Shortly after leaving this city, we got sight of the mountains in the west, which was gratifying after so long a sojourn on the level plains around Tien-tsin. Still the surrounding country had much the same appearance. Towards sunset we arrived at a river flowing from the north, called the *Lai Leeha*, and had much difficulty in crossing it, owing to the strong current flowing at the time; however, nothing appears impossible to the Chinese to accomplish when they once set their mind to it. After no little manœuvring with ropes, we got the mule-cart down a very steep bank or to a ferry-boat, and with much trouble got our mules and horses on board, and so were ferried over.

I noticed several men and boys carrying coal to the river-bank in baskets; they brought it from the coal-mines not many miles distant, from a place called *Chin Jola*. They carried it to villagers on this side of the river. It was dark when the cart and horses got once more on *terra firma*, and we had to continue our journey for three or four miles before coming to an inn. Our journey amounted to nearly thirty-one miles a

day, and our position, according to Chinese statement, is as follows:—

Pekin, 100 lee N.E.
 Pow-t'ing-t'ao, 200 lee S.W.
 Tien-tsun, 202 lee S.E.

By ascertaining the relative position of a place to two or three other known localities, it was not a very difficult matter to mark the place on a map: from these data I constructed one on my return, and found it very little out when compared with the Jesuit chart of the province. The mul-cart drivers know the distances of places to a mile, and they have a very correct notion of the compass-bearing also, as if they had been accustomed to its use.

It was long dark before we arrived at our inn. The town or village was called Frowaiien. The western hills were distant thirty miles.

20th.—Started at an early hour, enveloped in dense fog. As the day advanced this fog cleared off, and the mountains did not appear to be very far distant. After a ride of about six miles I reached a walled city, called Chai-jola, with triple sets of outer doors to each gate. The south wall of the city is only about a quarter of a mile in length. The east and west walls are about a mile long. There are two beautiful Temples in it; they are close together, near some temple buildings, there are no balconies about them, as in many others.

While passing through the streets of the city I noticed a number of black, sweep-like fellows leading mules or donkeys laden with coal from the coal-mines, about 5 or 6 miles distant. There were also a number of mules laden with baskets, or open sacks of cotton. The beautiful snow-white cotton and the black coal being brought in close contact made a strange contrast.

Passing out of the northern suburb, I found myself entering on a beautiful causeway, a third of a mile in length, having ten arches, and built of very large blocks of marble and granite. It was 40 feet in width, and protected at the sides by a high parapet, ornamented with entablatures, on one side of which I noticed the figure of a lion, remarkably well executed in bas-relief, evidently copied from nature. On another entablature I noticed the figure of the Asiatic elephant, holding a pineapple in his trunk. This figure was also the work of a good artist, and was apparently a close copy from nature. A large tablet on the side of the bridge stated that it was built in the Tung dynasty, 7th century, one of the most remarkable dynasties of China, which at that period held sway as far as the Caspian in the north, and southwards over the present Indo-Chinese kingdoms. Thus the lion and the elephant may have

been intended as symbols of the extent of the kingdom. The further extremity of the causeway was terminated by a gate-like structure of curious design. Though formerly of use in spanning a wide river, it is no longer so, as a small stream alone remains. To the eastward there was an appearance of a wide lake having existed there at one time, but even this is at present under cultivation. Passing to the country beyond, I found the same cultivation of crops as in other localities, wheat, millet, Indian-corn, cotton, &c. The road led in a northern direction, so directly that I found we were passing the southernmost point of the range, leaving it on my left hand. I then took a course across country, and was fortunate in finding a road, which led to the hills in a circuitous manner. Passing through a village at the foot of the hills, I saw some fine slates, which were quarried in the neighbourhood. Entering a valley by a tolerably good road, I met some countrymen, and enquiring where the road led to, &c., we rather puzzled them to understand why we were there, or what we were doing; and on telling them we came to shoot pheasants in the hills, one of them wanted to know if I was engaged in that particular line of business, and if I was also buying pheasants; however, they kindly directed us on to a village, where we would find a temple in which we could get lodging accommodation for the night, now fast coming on.

Proceeding for about two miles by a narrow road leading through a contracted valley, we arrived while it was quite dark at the temple called Poo-je-Pse. Our arrival being noticed abroad, some of the villagers called to see the foreigners, and among them a very obliging fellow, who proposed to be my guide through the mountains in search of game, assuring me that he was a very good sportsman, himself and that there were deer, antelopes, bears, tigers, wolves, foxes, hares, pheasants, and partridges, so it was arranged that we should start at an early hour on the following morning in search of game.

30th — Passed a tolerable night in the temple, and after breakfast found my sporting friend kept his word; he brought with him, as his firing-piece, a common matchlock; and had a lighted jossstick in his hand to light his match when required. We took the hills on the southern side of the valley, and soon saw that dogs were perfectly useless in the country, owing to the presence of a dwarf plant, of a species of *Rhamnus*, scarcely higher than the grass, having very sharp strong spines, which disabled the dogs in a very short time, and had on one occasion caught the ear of one of my dogs, and held so fast that, had I not seen the poor beast, she might have been lost. My sportsman shortly pointed out

the spoiler of a fox, and, on going up to the top of the steep hill, I saw him. He was one of those large foxes with very long fur, so highly prized by Chinamen for winter clothing. I fired at him, but he was too far off; and shortly afterwards I found my sporting Chinese friend also fired at him as he ran past him, but only wounded him slightly; showing he had considerable expertness in using the clumsy matchlock. We discovered traces of his blood, which, with the help of the dogs, we followed for some time, till we found he had gone to earth. My dogs being completely exhausted I was obliged to return to the temple, and after refreshing myself with a cup of Chinese tea—here drunk without milk or sugar—I ordered my horse and rode up the valley for about four miles. The scenery in front and on both sides of the valley was beautiful in the extreme.

As many of the people of the hamlets along the course of the valley came out to see me, I noticed that goutre was very prevalent among them; some young women had it developed to a very large size. The common scarlet persimmon-tree was very abundant. There were extensive pear-orchards in various places throughout the valley. The pears had been already collected and stored in peculiar hive-like structures, placed near their houses or in the open fields, where they remain till disposed of to people who come from Peking or other localities in the plains. I had an opportunity of seeing how these structures were made. There were first a row of trenches cut in the ground to a depth of about two feet, over these a layer of wattles were spread, then some millet-stalk; and resting on each of these drafts was a large mat, united at both ends so as to form a ring about five or six feet in diameter, and about four feet high. The pears were placed inside this, resting on the millet-stalk below, and above all another mat was placed, so as to form a conical-shaped roof. This kept off the sun and rain effectually. The drain underneath was necessary to admit of some ventilation through the mass of pears above, and to allow the exudation of moisture from the surface of the fruit to pass through. The pears were fully ripe, of a yellow colour on the surface; very good to eat, and, though rather hard, were very juicy. They are very much sought after by the Chinese, especially when sick.

The hills on each side of this valley appeared very abrupt on their southern aspect, while they were more sloping on the northern. The rock varied considerably. A gray, slate, stratified rock prevailed to a considerable extent; and at the further end of the valley enormous slabs of fine slate, capable of being turned to account, appeared in the river-bed, and projected from the sides of the hill. On entering the valley, quartz rock, and in parts a freestone grit cropped up; but there was no other

appearance of granitic formation; at the further end of the valley a black basaltic rock rose perpendicularly to a height of two or three hundred feet. At the base of one of the hills on the northern side of the valley I found some nodules resembling kunker. The general appearance of this valley gave me the idea that it had been a creek, at the time that water occupied the level plain to the eastward, and when the western hills formed the western boundary of the Gulf of Pechili.

31st. Intended visiting the famous Temple of Shan-fong-shan, situated high up in one of the mountain gorges, with a short distance of 12, but was induced to deviate from the road up a valley, where I was assured there were pheasants to be shot. Taking the sportsman and a coolie with me, and having sent on my servant with my bed further up the valley and close to the precipitous bluff, to a temple called Swang-ching-mau, we made a circuit round the hills by a very picturesque valley, in which there were a few patches of cultivated land, fenced in by stones and the usual pear-tree orchards.

Late in the evening we reached the temple, as appointed in the morning, and found my servant and bed already there.

November 1st.—Left the temple shortly after the appearance of daylight, and taking my gun and dogs beat a very likely cover not far off. The trees were walnut with an undergrowth of scrubby oak, having beautifully tinted leaves, now commencing to fall. The morning was remarkably fine and the air bracing, numerous birds flitted about the trees, and the song of the mountain-thrush resounded on all sides, besides finches, larks, and many others, whose notes and calls I could not make out. Finding no game, I returned to breakfast at the temple where I passed the night. And just as I arrived I saw a large flock of a curious-looking goat being led out to pasture. The old ones had very long hair of a dark grey colour touching the ground, and the kids had a short, curly, jet-black coat, resembling Astrakan lamb-skin. I have since seen some very fine skins of the kid of this species of goat from Shansi which could not be distinguished from Astrakan lamb-skin.

I learned that the name of this mountain over the temple is Wai-sa-poo-shan; its summit is extremely serrated and its face all but perpendicular. There is a similar range to the north, and the temple is at the angle where the two ranges join each other.

After breakfast we started for Shan-fong-shan, having thanked the priest for his hospitality and presented him with a dollar, which he received with much assumed unwillingness, being, as it were, against his conscience to accept any gratuity.

After a tedious and difficult ascent of what appeared to be

about three miles up a narrow gorge in the northern hills bounding the valley, I reached the famous Buddhist monastery of Shai-fong-shan. Parts of this gorge were extremely magnificent in their bold scenery. On each side were precipitous rocks with overhanging pine or other trees rising out of the cliffs wherever a little soil was collected. On reaching a precipitous part about the middle of the journey the pathway led up a very steep flight of steps cut out of the rock, on each side there was an iron chain fastened, by which it was necessary to hold while ascending or descending. On the top of these steps we passed through a doorway and entered a kind of temple-looking building, where it was customary to rest and recover from the fatigues of the ascent. A few priests lived in these buildings, and no doubt formed a sort of guard to protect the approach to the monastery. They were very civil to me, offering me tea to drink and pipes to smoke. They also offered delicious cool water, which was still more agreeable. Continuing our journey over less difficult ground and through beautiful scenery, in which I noticed a small cascade overflowing the rocks in a very precipitous place. I was told that in winter this formed a very fine cone of ice, which daily grew higher and higher, as the water did not cease flowing. Occasionally a flock of jays (*Corvus*) would be disturbed and fly over our heads from one side to the other or up the valley, their long tails and blue plumage making them very pretty objects in the scenery. At length we reached the largest of a number of temple-buildings, called Ho Soi Tao, and were ushered into the reception-room, where the head of the monastery welcomed me in a very civil manner.

After resting a little while, I expressed a wish to go further up the hill, and taking my gun with me and one of the priests for guide, he led me in a north-easterly direction up a narrow footpath, in parts very dangerous, and the grass being dried up my leather-soled shoes could take no hold on it, so that I felt as if I was walking on ice, which was anything but comfortable as the way led along the margins of deep precipices quite sufficient to make one's head feel dizzy; on getting to the summit I was well repaid by the magnificent view before me, and sat down for some time to enjoy it. I found the hills on the other side cut up by deep perpendicular precipices, some of which appeared to be of great depth. The country beyond in the direction of Peking (eastward) appeared like a vast, level, sea-like plain, of a scoured yellow colour, with occasional insular patches of houses and trees and the course of dried-up river beds leading from the mountain-range to the eastward and southward. The horizon blended off into a dull impenetrable

mist. The pure air, the unusual stillness of the scene, and the bright sun, now beginning to set, made a vivid picture in the memory long to be remembered. On returning I made a long circuit round through the hills, and passed through much scrubby oak with a very large leaf. On nearing the monastery the bells began to toll from several detached buildings some of which were high up on crags on the highest part of the hills around. The effect was very pleasing and solemn. As we approached nearer the chief temple building I noticed several detached buildings buried in the surrounding trees, some of which were very fine and old, and among them I saw one resembling the decoliar of the Eastern Himalaya, its branches, having a great sweep, covered a large space of ground. On my return I found that a large, comfortable room, neatly furnished, was set apart for me.

2nd The tolling of the bells continued at intervals all night. At midnight I was woken up by the loud chanting of the service that was going on. Near the temple there is a cave with curious stalactites, and, from some legend connected with it in reference to a tiger, it receives its name of the Tiger Cave, and the temple is named from this cave, Hsiao-tze or Tiger Cave Temple; but, as I had seen enough of the place, I did not visit it. After breakfast I made preparation for a start.

While returning down the pass I saw several flights of the Chinese jay, or lan-tzor, which I have before mentioned. They appeared very beautiful in their native wilds as they flew from crag to crag. At the bottom of the pass I rested myself at another temple, the priest being very civil. I found this temple very clean and tidy, and a large collection of Chinese books in its library. After a short delay, I started off to the southward.

Finding the road to the southward was leading me back again in the direction of Chu-jo-li, and away from the mountains, and meeting with a cross-road I determined on proceeding to the westward, much against the inclination of my guide, servant, and mule-driver, who, as it afterwards appeared were misled by the priests of the monastery to avoid going westward and to go southward instead. Taking this westerly road, just as it was commencing to be dark, I could yet perceive the hills on my right hand had a most picturesque appearance, were very high, and rose abruptly from the plain: the summit was extremely serrated, not unlike the range observable at the end of the valley before alluded to: in some instances very high pinnacles were seen to project above the ordinary level, and in many parts they presented a strange overhanging appearance.

Some carts, heavily laden with boxes of tobacco, passed us on

the road, and on inquiry from their owners I found the road led to Shu-Ling, one of the imperial burial-places. Darkness had now set in, and, as none of us knew the road, we were anxiously looking out for a house on the road-side in the hope of meeting with a place to rest for the night. At length we met with a very uninviting, solitary, road-side inn, and as we were told there was no better accommodation within eight miles of the place, we were obliged to stay at it.

In the mean time the landlord, who showed himself very civil by offering his pipe and entering into conversation, going through the customary formula of 'What is your honorable name?' 'age?' 'where I was from, and where I was going, and what business I was on?' &c.; he then told me he had heard of my arrival at Shan-fong-shan, which he said was distant 40 lée, that is, about 13 miles; and from other places, as follows:—

Shu-Ling, 140 lée west,
 Aw-tay-fu, 180 lée south-west.
 Fookin, 110 lée north-east,
 Ching-shan, 25 lée south-east.

After dinner was over I looked into the larger room, and found a number of men had lain down to sleep as best they could on the tables and kang. I had my room all to myself, and passed a very good night. On the following morning I started off in search of some wild duck seen on a stream in front of the inn, and, returning unsuccessful, I proceeded on our journey westward; but after going a couple of miles further on, and learning that there was a comfortable inn at a place called Ta Shu Wo, and some small streams in the neighbourhood, where I observed some wild duck, I desired the cart and servants to stay there till my return to breakfast, while I took my gun and dogs, and went in search of some sport.

While eating my breakfast I was waited upon by a respectably-dressed Chinaman, who rode up to the inn on a very good pony, preceded by a servant, who was also mounted. He said he came to invite me to his house, as he heard that I was a wonderful sportsman, and that he would accompany me on a shooting excursion to the hills, as he was also very fond of sporting. Finding, on inquiry, that he was a respectable person, I was induced to accompany him to his house, situated a few miles off the main road towards the hills, on the borders of a small village. While on our way we passed several mules laden with coals coming from the hills, and on inquiry found that coal was procured in many places in the hills to the westward. I learned also that there were marble quarries in the neighbourhood, and soon came to one where a number of workmen were

busily employed. They were cutting out a large monolith. I found it measured 10 paces in length, and was about 3 feet in width and thickness. It appeared to be a fine clean block of white marble, though rather coarse in grain. It was intended for the construction of the late Emperor's tomb. A blacksmith was hard at work over his anvil sharpening the stone-cutters' instruments, which in size and shape resembled those used by our own workmen, but being made of iron and not steel, required more frequent sharpening at the forge. The quarry was almost in the surface, the rock being merely covered with a thin layer of red-ochery-looking earth, which appeared to be indicative of the presence of marble in several places.

I found my host a very civil Chinese gentleman. He said his age was sixty-five, and that he had been in the military service of his country in his younger years, and now retired on some property granted to him for his services. He was about 5 feet 2 inches in height, a well-made, straight-set, athletic-looking man. His house was not very elegant, on the contrary, it had rather a decayed, neglected appearance.

On sitting down my host offered me his pipe. He poured me out a cup of tea and appeared much pleased at my presence in his house. He now appeared dressed in his common clothes, having taken off his visiting dress, and fastening round his waist a pouch, in which he carried his ammunition, consisting of iron shot, some leaden bullets, and coarse powder, and taking down from a shelf by the wall a rusty old matchlock, he brushed the dust off it, and cutting off a length of a rope like slow-match, he put it into his waist-belt pouch, and was now ready for the chase. Unfortunately, before leaving the house I gave him some of my powder, with which he loaded his matchlock, and had reason to repent doing so, as it will appear presently.

When I was at his house none of his family appeared in the reception-room except his son, a fine lad about sixteen years of age—it being the custom of the country for ladies to keep themselves aloof from visitors, unless of their own sex.

We visited several places where there were large marble quarries, and saw a great deal of well-cut stone lying about. My host informed me that formerly there was much work going on in these quarries, but that for some years back it had ceased, owing to the badness of the times. Peking drew most of its building stone from these quarries, which also supplied most of the stone forming the bridge at Chu-jo-la. The blocks had lost their white marble-like colour, and became dark grey from exposure.

In our excursion we passed near several young plantations of that peculiar pine whose bark strips from the stem in oval

scales leaving the under surface white, and so causes the stem to present a curious mottled appearance. These trees are very much sought after by the Pekingese for planting around their family burial-places.

We crossed several streams of bright, clear, running water, flowing from the hills, and at times passed through places which reminded me of home scenes. On one occasion I was astonished at seeing a regular mill-race, and following it down its course came upon a water-mill of curious primitive construction, showing a low order of mechanical skill. The water-wheel being made to rotate in a horizontal position, one shaft only was required to make the mill-stones revolve. In this mill the corn was simply ground, the Chinese mechanical ingenuity having failed, as it were, to adapt the same water-power to a contrivance for separating the flour from the bran.

Wherever the ground was sufficiently level there farming operations were carried on. The land was being ploughed, or winter wheat had already been planted, and was now growing, and fields of cotton-stubble showed that cotton was produced here also. It was also observed that tobacco was cultivated more generally.

I noticed several country carts laden with blocks of brown marble on their journey to Peking; and as each cart showed a small yellow flag, it was at once seen that they were employed in the imperial service, and were conveying the stone to construct a costly tomb for the late Emperor.

Late in the afternoon, as sunset approached, we sat down on some rocks to rest ourselves after our tiresome walk over the hills, to smoke a pipe and enjoy the scene around us. There were some labourers ploughing in the field close by, and I observed how steadily and neatly they did their work, nor did they appear to be in any hurry to leave off, although it was now getting late. I observed also that they were well dressed in blue cotton clothes, and wore the usual felt-soled cotton shoes of the country; and I made the remark, wherever I met with field labourers in China, there were none over seen in tattered clothes, or badly clad.

While we were resting in ourselves I fired my rifle at an object about 200 yards distant, and astonished my host by hitting the mark with such precision. He tried to hit the same mark with his matchlock, when it gave him such a kick in the face, the butt being well tight up to the cheek, that it exposed him and hurt him rather severely; he unfortunately loaded it with English gunpowder, which he fancied was inferior to his own owing to the small size of the grain. Only that the poor fellow appeared to be hurt I could have enjoyed the affair, then.

perhaps I should have congratulated myself that the matchlock did not burst.

On our way home we passed through the village, and created so small excitement among the inhabitants, all of whom appeared to turn out to see me; they were very civil, although their curiosity was great.

4th — Bid good bye to my hospitable host, and started for She-Lu at an early hour of the morning; there was no appearance of frost, although thin films of ice had been found on pools of water the previous morning. Our road led in a south-westerly direction, not far from the foot of the hills, whose sides appeared remarkably precipitous for a considerable distance, and showed a strange horizontal stratification, some of the strata being as white as marble. This range of hills kept parallel to the road for about 50 lee, and then tended to a north-westerly direction. With the exception of one or two isolated hills of no great height, the country to the southward had the same level, plain-like character, and in some parts of our course the road was deeply worn below the level of the soil. Shortly after leaving our last resting-place we had to pass several streams, some of which were of pretty large size, and during heavy rains must be impassable to carts, their sources being in the neighbouring range of hills. They flowed over stony beds to the southward. Our road passed between two conical isolated hills rising abruptly from the plain; and here the range bent off to the north-west, taking a wide circuit of about 3 miles (12 lee). The country around was well cultivated, as before described. There was also much ground under tobacco cultivation, and long rows of leaves of the plant suspended from ropes to dry taen in the open air, were frequently met with near their houses. The country people were tall and manly-looking, spoke with a good deep voice, and appeared to be rather partial to their whiskey.

While passing along the road I met with many carts heavily laden with large bales of dried tobacco-leaf on their way to Peking and to the towns of the south. To one of these carts I observed a large, good-looking grey Arab horse, harnessed together with a mule and a donkey, three animals being very often placed aside in the fore part of a team. He and my steed immediately recognised each other by a mutual neighing, &c.; and I found on inquiry that this poor beast, so ignominiously reduced to labour and to such low company, was one of the horses of an Indian cavalry regiment employed in the campaign of 1860, and sold at Tientsin, on the regiment being sent back to India, to save the expense of retransporting them. This poor horse and the one I rode had probably been stable companions

together, but how different their lot! However, he might have met with a different fate, as many of these horses, who were in first-rate condition, were sold so cheaply that they were killed and disposed of as meat by the Chinese butchers to their people, who are by no means indisposed to eat horse-flesh whenever they can get it. We refreshed ourselves at mid-day at a road-side inn.

After a ride of about 8 miles over a flat country, well cultivated, with mountainous scenery almost surrounding us, we reached a walled city called Echo-shu, and passed by the road to the north of it. This portion (the northern) of the wall was only about a quarter of a mile in length, and had no city gate in it. On the right-hand side of the road I noticed a large building, enclosed in high walls, and was informed it was a yamun, or government office. Shortly after passing this place we were rather startled by the report of a matchlock not far off, and still more so by hearing a second report: we could scarcely make out what this meant. As it was now getting dark and a long distance before us, I could not spare time to make any enquiry, so proceeded on our way. The road here was in good order, and appeared to be well kept. Several people were employed in levelling and sweeping it, and on each side it was bordered by a ditch, much resembling our road-side ditches, so unusually met with in China. The scenery appeared very fine, owing to the close proximity of the hills. The road entered a very narrow opening in the hills, and again opened into a large valley with high mountain scenery all round. Just at the entrance to this valley there were some large buildings, which I afterwards learned were yamuns. There were a number of people assembled here, and, as I rode up, I noticed one man gestulating very vehemently, evidently very much excited. However the people he was addressing appeared very anxious to see me, and beyond a continued stare as I passed showed me no incivility.

It was my intention, by the advice of the guide, to go at once to the yamun of the chief official and stop there, or in the vicinity of his residence; but my mule-driver, meeting with a friend of his among the crowd, and learning there was a good inn further on in a large village, we proceeded there instead. The crowd of people who assembled on the road-side and near the village was very great. While talking with them a white-buttoned mandarin made his appearance, and in a respectful manner said he was sent by his superior officer to enquire who I was? and where I was from? Where going? and what was my business? To these questions I replied by handing him my passport: he received it, and said he would return it to-morrow

morning. I asked him to give my compliments to his master, and mention to him that I would call on him to-morrow; he then left.

5th. Early this morning I was waited upon by the white-buttoned mandarin, who came to bring back my passport, but told me I could not get into the precincts of the tombs of the Emperor, and that his master could not even go there, nor could I go further in that direction, that it would not be very safe for me to do so, as there were a number of soldiers in the vicinity of the place who might be rude to me, or perhaps treat me very roughly, and on this account advised me not to stay any longer in the neighbourhood; in fact, he was in a great hurry to see me safe out of the place. He also said the mandarin declined to receive my visit, as he did not know exactly what business I had with him. I then proposed to walk up the mountain close by the inn, from which I could get a view, at all events, of the place, and told my servant to get him some breakfast at the inn, and afterwards we should see what I could. He said it would be necessary to ask his master for permission to do this, and that he would go to him and return with an answer. He returned in a short time with a favourable reply, and proceeding a short way up the hill I got a very fine view of the place. I saw at a distance of about a couple of miles the yellow-tiled roofs of two of the Mu-Lungs or mausolea of the Emperors of the Tsing dynasty in a large walled enclosure. It was so thickly wooded I could not distinguish the other four. Altogether there are six Emperors buried there, viz.:

1. Shunchi ..	reigned 18 years, dates from 1644
2. Kienli ..	" 61 " " 1662
3. Yang Chong ..	" 13 " " 1723
4. Kien Lung ..	" 60 " " 1736
5. Kao Kung ..	" 25 " " 1796
6. Tai Kwang ..	" 29 " " 1821

The Emperors Kanghi and Kien Lung are the most remarkable and interesting to us, on account of the patronage given by the former to scientific Europeans who taught the Chinese astronomy and carried out a grand survey of their country. They also encouraged the literature of their country to a great extent, and the latter received embassies from Holland, Russia, and England. The high wall of the southern margin of the enclosure appeared to extend for about a mile in a straight line; about midway there was an ornamental entrance, and in the distance behind, forming a background, there was a high range of thickly-wooded and rocky mountains.

While passing out of the valley through the narrow entrance

I observed, on the hill not far from the yamen overlooking the road, a respectably dressed old Chinese gentleman seated on a chair, with one or two attendants near him. He evidently came there to see me, and on inquiring from the guide who he might be, he suggested that it was the chief mandarin of the place, who was too proud to receive my visit, but who gratified his curiosity in this furtive manner, and I cannot but tank at the expense of his dignity also: we soon had the road to ourselves as none of the people cared to follow us further.

Taking advantage of a turn of the road which led more directly south we followed it; it led to part of the western suburb of E-chow, which had the usual dingy appearance of the suburbs of a Chinese town. There was a very fine Tsai or pagoda in this quarter, but it had nothing remarkable about it except its height and close proximity to the wall of the city. A very dull place, and of small size, its principal trade consisting in the purchase and sale of tobacco grown in the surrounding district. As the day was not very far advanced we determined to get out to the high road to Pow-ting-Foo, and not stop at E-chow.

We had not proceeded far when the atmosphere became so very dusty we could hardly distinguish the hills and mountains distant about a mile or so on our right hand. We were in fact encountering one of those remarkable meteorological phenomena called by the Chinese Qua-Fung, or dust-storms, so common in North China at certain seasons of the year; and are most disagreeable, not only on account of the dust which penetrates clothes and boots, and soils all furniture, &c., but on account of the disagreeable sensations experienced by the body, partly owing to the dry condition of the atmosphere, and partly to electricity. However modified this may be in China, they are no doubt of the same nature as the T-hlad or dust-storm of Central Asia, so admirably described in Mr. Vambery's recent work.

Towards evening we passed through a very deserted straggling-looking village. We passed over a space of about two miles, which had very much the appearance of being subject to great floods, and had probably been a river-bed. Farther on, the ground was more uneven, and at times the road was so much below the level of the fields on each side that it was necessary to get out of its track to see the country. This was attributable to the strong winds and the loose texture of the soil. Towards evening we reached a large village called Yun Tsun, where I found an inn.

6th.—Our road led through a perfectly level country, very

highly cultivated, and high ranges of mountains were visible to the westward, gradually disappearing in a south-westerly direction.

The road we were now travelling on was an open track-way, sufficiently broad to admit several carts to travel abreast. There were several guard-houses, at intervals of about a quarter of a mile from each other, throughout its course. They were very simply constructed, of a square form, with a door, and sloping roof, and had a kang inside, on which three or four men could sleep. There were larger guard-houses, resembling military stations, at further intervals. They were necessary to protect the large traffic along the line from being disturbed by banditti, who would otherwise frequent it.

After a long, bleak, and monotonous ride along this road, without meeting anything to excite our attention, except these guard-houses, and occasional villages in the distance surrounded with clumps of willow-trees, we at length observed the outline of a long crested wall, rising before us in a southerly direction, just as it was commencing to be dark. This was the first appearance of the long-wished-for city we were so anxious to reach before nightfall. We passed through the main street in almost a straight line to near the east gate, and, turning to the right, we at length found ourselves in the yard of an inn of large size. I got a tolerably comfortable room to myself, but was obliged to send to an eating-house in the neighbourhood for my meals. I was immediately waited on by two Yamen officials, who appeared very civil, though very inquisitive; and, among other questions, asked if I had brought any books for distribution among the people, referring to missionary tracts. I gave them my passport, at the same time requesting that I might have a guide sent to me. Later in the evening a man, not in official dress, but accompanied by five Yamen men, wearing the distinctive hat, waited on me, and presented me with my passport, saying also that he would call on me to-morrow and accompany me through the city. He told me that the city had a large population, nearly as large as that of Tientsin, and that it was the prefectural city of the province. He said that two missionaries had been there lately distributing some books, and mentioned the names of Messrs. Atkins and Blagden. He also mentioned that he had known me by repute, having heard of the hospital at Tientsin, and that many of the people of the city had been to it.

M.—My guide called on me at an early hour, when we set out to see the city. I was much surprised at the long streets we passed through, and the clean and tidy appearance of the place.

The atmosphere was quite clear from the abominable odours encountered in Chinese cities in general, and there were many good shops and houses, showing that the place had considerable business. Some of the drapers' shops were particularly fine and well stored with goods, and the apothecaries' and tea shops looked very respectable. My guide brought me to a place where some stalls were erected for displaying goods for sale. It was in the vicinity of a large public building, where there were several open courtyards. I learned it was a market or fair that was being held here, and that people brought their goods from distant places. I found large quantities of felt carpets, generally about six feet in length, by four or five wide; though there were some large enough to carpet a large-sized kang, they being intended for that purpose. They came from beyond the Great Wall, and were made at a place called Chang Chi Kow, on the borders of Mongolia. There was also a large display of furs for winter use; chiefly white and black lambs'-wool skins, fox-skins, wolf-skins, wolverine, sheep-skins, goat-skins, squirrels, ermine, sable, and unborn camel, and one or two tiger-skins; large quantities of foreign cloths, both wool and cotton, and cloth of native manufacture, white and dyed blue or black; also silks of home manufacture, ready-made clothes, &c. There was also a curiosity shop, very neatly arranged with jars of crackled and other kinds of old china, cups, bowls, plates, bronzes, enamel vases, &c.; jade ornaments, scroll-paintings, and some beautifully illustrated manuscript books; besides inferior Chinese crystals, gems, glass imitations, and an immense catalogue of what are generally found in Chinese curiosity shops.

I found the north gate of the city in the protection of the most unimilitary-looking guard it is possible to imagine, and passing through it I found, at the distance of about 100 yards from the crenelated wall of masonry, a crenelated mud breast-work, which appeared to be carried all round the city wall. There was a canal-like river in front of it, and the bridge I crossed over had a defensive work on the further side. The houses of the northern suburb extended along the road, and were considerably above it, the road having been worn away by the wind or rain, and the constant traffic of carts upon it.

At first the day promised to be fine and warm, the sky being free from clouds; but as we advanced on our journey we became enveloped in a dust-storm, or *Qin-Pung*, and the wind from the westward increased to a gale. Towards evening it became intensely cold, and though I was well covered with warm woollen clothes, consisting of flannel, shirt, cloth waistcoat coat, and thick pilot overcoat, I felt the cold penetrate to my skin. While

the storm was at its height we met several carts, on each of which there were about ten men, in such miserable plight from the cold that they hardly noticed me as we passed. Though they appeared to have no military arms with them, and were in plain clothes, they were soldiers, proceeding from Tien-tsin and other stations to P'ow-tung-fu to join the army engaged in operations against the Nien-foi rebels of the neighbouring province of Shan-tung. They were covered with dust, and nearly all of them wore goggles over their eyes, to protect them against the fine penetrating particles of dust, which is the cause of that vast amount of eye diseases which we find the inhabitants of the north of China especially subject to.

Reaching a town called Gna-shu-sha, we were glad to find an inn in the eastern suburb, being in a miserable plight from cold and fatigue; we had ridden 50 lee, or about 17 miles, without resting.

5th.—Started from the inn at Gna-shu-sha at an early hour of the morning, which, though fine, with bright sunshine and a clear atmosphere, felt piercingly cold. There was ice on the pools of water, and frost on the ground. The suburb had a very dilapidated appearance. The city wall was in the form of a parallelogram, longer in its north and south sides than in its east and west. The latter did not appear more than about 400 yards in length. In many parts it had fallen down, so that it afforded no protection to those living inside. It appeared to be a fit symbol of the moral reputation of the place.

Beyond this town the country appeared more undulating; the soil was light and sandy. Our road did not proceed in a straight line, but, on the whole, tended in a north-easterly direction till we reached a bridge, crossing a river about 150 yards in width. The bridge was narrow and made of wood, and was supported by numerous trestles of stout spars, rising to a considerable height above the water. Proceeding a short distance along the northern bank of this river, named Pei-ko-ho—and no doubt it was its origin in the few streams I crossed over at Ta-si-wo, close to the western hills—we entered a village of considerable size and trading importance, named Pei-ka. We passed over a bridge of masonry in the middle of the town, and found a large number of narrow boats moored along the quays at each side, and a considerable quantity of coal stored there. There were a great number of boatmen, who were engaged chiefly in the coal-carrying trade; this river, the Lee-ho, being navigable for their narrow boats to within a short distance of the coal mines.

We proceeded by the road still in a north-easterly direction, and towards evening met with a long procession of men and

priests, and numerous carts laden with bricks and tiles and timber. There appeared to be about eighty of them, and the procession extended about two miles. In about the middle of it there was a colossal figure in a sitting posture, dressed in red robes, and holding a scimeter in his right hand; his face was painted blue, and his prominent staring eyes and defiant look gave him a most diabolical expression. He was called *Er Long Ye*, meaning Son of the Wolf. He was supposed to have great influence over rain, and was intended as the tutelary deity of a new temple that was being founded in a village in a farming district distant about fifty *lee*, and had been carried a couple of hundred *lee* from a large temple, of which this was possibly to be a detached companion or offshoot. He was carried on a platform supported by sixty men, and a man stood behind looking over him a large red umbrella of state, similar to those seen in the processions of mandarins of high rank. The bricks, &c., were intended to lay the foundation of the temple, which my guide informed me would be done with some necromantic ceremonies and jolification.

Proceeding a few miles further on we came to a village called *Shako*, at which a fair had been held that day.

9th.—Morning cold, but as the day advanced it became warmer. Our road led in a north-easterly direction through a country mostly cultivated with cotton. Took breakfast and rested at a wayside inn at a village called *New-Tsoo*. Found the place also very busy with a fair that was being held. There was much cotton in large sacks, and I also observed some oxen and ponies exposed for sale. Occasionally large herds of oxen are to be met with. They come from beyond the Great Wall, where they are to be found in herds of considerable size feeding on the pasture-lands of Mongolia. These oxen are in great request in the north, being commonly used as beasts of burden and for agricultural purposes. They have some resemblance to the European kinds, and, besides being coloured and marked like them, they give a full-toned note when they low, which is almost sufficient to denote a common kindred. They are not inferior in size, and are probably stronger and larger boned animals. They are apparently a clumsy, heavy-headed, and coarser species. These characters being dependent on the prolonged severity of the winter season of the north of China, of late years numbers of these animals have been imported into Shanghai from the north of China to supply the military commissariat, and during the expeditions against the *Taijings* in the interior, they accompanied the force to supply the troops in the field with fresh meat. On these occasions they would be





allowed to graze on what appeared to be good grass growing on the fields which had lain uncultivated for two or three years. It was remarked that these northern cattle would pine away and die, and on examination of the interior of the animal large tangled masses of grass were found obstructing the intestines.

After a smart ride of about 12 miles I found myself at the residence of my guide, who took the opportunity of revisiting his family on our return home. Feeling myself rather unwell I was quite indifferent to this arrangement, as I knew I was within easy distance of Tien-tsin, to which I was anxious to return.

I was much struck at the cold greeting of the family on the guide's arrival; the expression "have come" (*lai leen*) was said by the mother, and the same repeated by the son. The weather feeling very cold, and being rather unwell, the family made me as comfortable as possible, and managed a warm bath for me, so that I was able to move on my journey the next day by reclining on my bed in the cart. The road soon turned on to the embankment already alluded to, only on this occasion it continued more along its course till near the ferry over the western river.

On entering Tien-tsin I found the narrow streets crowded as usual, and what struck me as strange was the frequent collections of men, women, and children, eagerly looking through stereoscopes exhibited by strolling showmen at the rate of one cash for seeing each slide. This was a strange evidence of the rapid progress of Western civilization.

XIV.—*Notes on Eastern Persia and Western Beluchistan.*

By Colonel F. J. GOLDSMID, C.B., F.R.G.S.

EARLY in 1863 I had the honour of submitting to the Royal Geographical Society some notes of an exploration, made during the previous year, along the coast of Eastern Beluchistan, a tract of country comprised between 62° and 67° E. longitude, and little known to Europeans. I had proceeded from Kurachi westward, with a view of arranging for a coast-line of telegraph; but circumstances prevented me from continuing the route beyond the port of Gwadar, and the orders of Government necessitated my return thence to India. The close of 1863, however, was favourable to a resumption of the deferred journey, and in December of that year I found myself engaged in an enquiry which promised to supply new information of interest on the

western shores of Mekran, or that portion of Beluchistan situated between 56° and 62° E.

It so happened, however, that at this particular period the late lamented Colonel Patrick Stewart was about to lay the telegraph cable in the Persian Gulf. Telegraphic communication with India had not become a *fait accompli*, as at present, and was looked forward to as an object of primary importance. Instructions to accompany the telegraph expedition took me away from the Mekran coast; and personal acquaintance with the scene of intended exploration became limited, on this occasion, to a hurried unceremonious visit to Choubar and Gwattur, small ports west of Gwādur. A brief description of these places is given, to supply what might otherwise appear a wanting link in an overland journey from the Caspian to Karachi, of which the completion would be shown by making the paper read in 1863 a sequel to the present.

On the 14th February, 1864, I took leave of some pleasant companions in H.M. steamer *Victoria*, then lying off the Mekran coast, in quest of soundings for the cable, and, between three and four in the morning, dropped into a native fishing-boat to make my way to Choubar, distant from 25 to 30 miles. We reached it at about 9 A.M.

Our boat's crew were twelve in all, including myself and servant, with Hapi Abdu, an old acquaintance whom I had hired as a guide at Gwādur. Our acquaintance was, therefore, not very imposing, and, when the landing was effected, my suite was reduced to a single individual, the Hāpi. We were received by a Maseat Khwoja, and an Arab of the Wali's retinue, escorted to the town, and presented to the Chief himself, who sat awaiting us by the gate of his fort. A number of people crowded around, the usual salutations were made, the usual questions asked and replied to, and I entered upon business. A certain reserve, which I had seemed to notice in the first instance, gradually wore away, and nothing could be more friendly than the advanced stage of our meeting, which was finally dissolved by the introduction of halwa and coffee. The next process was to take me to a garden where halwa was re-introduced, and I had no resource but to add to it figs, walnuts, and cocoanuts. Here we stayed for some time, in pleasant conversation, the Wali's son and the Khwoja acting hosts with true Arab gusto and hospitality. The latter, in addition to his native Arabic, spoke Hindustani and Persian readily, and was a man of more knowledge of the world than might have been looked for in this particular locality. He farmed the Choubar revenues from the Imam for a fixed yearly sum.

The village of Choubar is situated on a sand Lilloek in a small

bay of irregular shape, formed by the two points, Rās Tiz, north, and Rās Choubar, south. The latter, though quite insignificant in height, is usually acknowledged by the impetuous rush of water around it, and marks the eastern entrance of the large bay whose name it bears. It is placed by Horsburgh in latitude $25^{\circ} 16'$ N. and longitude $61^{\circ} 35'$ E. The same authority calls the bay of Choubar "one of the best on the coast;" but the further statement that the town itself is "the best on the coast," is certainly not supported by the *prima facie* impressions of a personal inspection. The fort may be larger than that of Gwadar, but is only remarkable from its contrast to the mat-huts around it, and, if found among other mud-buildings, would attract no more attention than any ordinary village structure or enclosure. The huts are perhaps a little more compact than the huts at Gwadar, but these last having been hurriedly put up since the fire of November, are now seen to disadvantage. There are certainly more trees in Choubar, and there is something more like garden cultivation. The coconut, olive, and mango were conspicuous, and yet not alone; and it was refreshing to see the familiar well, waterbag, and watercourse, however primitive. I observed little which seemed to require special note. Perhaps the *mausoleum* of Pīr Hyder at the point, and the Khwaja's shrine north of the town, are as remarkable objects as any.

The population is but small. The number of houses has been given to me as 225, and I should compute roughly the inhabitants at about 900, although the Bunya's statement, as follows, is not so liberal:—

	Houses.	Occupants.
Māda	30	80
Barzā	40	80
Kēpā	30	85
Tā's and others	40	100
Blā's	40	100
Kawojas	10	30
Peenwas	5	15
Hanabā	30	70
Total	225	560

The Wali, or Governor, Rashid, has his ten Arab attendants; but the protection of the place is left to others. The yearly sum for which the revenues are farmed is said, on good authority, to be 6000 rupees. Its disposition is important, as showing the relations of the Imām and his Mekrani neighbours:—

Rupees	500	to Dā M. J. of Bahā, for protective purposes.
"	200	to M. A. J. of Gād, for ditto.
"	1,000	to the Wali in charge.
"	3,300	to the Imām, after defraying cost of establishment, maintenance, expenditure, &c.

Ghee, cotton, wool, goat's-hair, mat-bags, moony, and jowari, are brought in from the interior, a levy of 5 per cent being exacted on export. A very recent rise of $1\frac{1}{2}$ per cent is shown in this account. Imports from Gah, Bini, and Kussarkund pay $1\frac{1}{2}$ per cent; but no charge is made from those of Ikhu Dastiyari. Rice, dates, and wheat, come in for purely local consumption.

I procured a boat for the *Victoria*, and tried to purchase some half-dozen sheep to send in her, but none were to be had except at a day's notice. In a day they could get me as many as I pleased. From all I could gather, it appeared that an ample supply of provisions might be thus obtained at any time; but a short previous intimation was always necessary. Bâlu is a good and convenient depôt. According to Kinnier, it is distant 22 miles from Choubar, and on the direct road from thence to Kedge. The same authority, quoting from Lieutenant Grant, places Gah at about 80 miles, but in a line more directly north than Bâlu, which is to the eastward. Its position was pointed out to me by a boatman when we sighted the bold picturesque hills north of Choubar Bay. He also showed me the salt-yeeding hill of Yâreg; but Lieutenant Grant's "Neem Khor," at its foot, he would only recognise as the "Namek" or "Nimek Khor," or Salt River.

Tiz, the ancient "Tiza," is divided from the low sand hillocks of Choubar by a range of hills, in height about 400 or 500 feet, through which there is a road to the village. There is little left to mark its former importance. Doubtless its prosperity rested much upon a river which, wherever it rose, issued out to the sea at the spot now known as Kenj Khor. Not a boat was, however, to be seen; in fact, there was no boulder or landing-place, but a shallow anchorage, necessitating the use of canoes to those who were not inclined to wade some 300 or 400 yards in the water. The Persians have a strong desire to revive this port, and are supposed to be building a fort there. I had intended to land, and took a guide accordingly from Choubar; but on reaching Râs Tiz I found the village so distant, the shore so deserted of inhabitants, and the ascent of the hills a matter of so much time, that I contented myself with a reconnaissance from the boat, and moved off to sea again.

Night set in soon after we had passed the Choubar low land and got clear of the bay. The *Victoria* lay at anchor in the distance, but we did not speak her. In the early morning we were at Râs Bris, near to which the Choubar territory is said to extend. This is a repetition of the Mekran cliff, visible at the Mahan, and all along the coast. It has a long seafront of several miles of crumbling but smooth sandstone, whitish in colour, but

capped by a flat, thick, regular brown crust. It has also a bluff irregular cape, giving a sheltered nook to fishing-boats on the west, and a smaller projection to the east. To the traveller from west to east this is followed by low hills of loose white sand, with, for the most part, a good beach. A long hill, called *Drannoke*, and one of different shape, called *Priehuk*, are succeeded by *Cape Farsa* and *Farsa Island*, the entrance of the large *Gwettur Bay*, on the westward. On the sea face of the cliffs, near the extremity of the Cape, is a spring of sweet water, much used by *kafilas* and passengers to and fro. About here, too, I saw to the southward, distinctly but far beyond hauling distance, the three steamers, *Ceremandel*, *Zenobia*, *Semiramis*, on their way with two sailing ships from *Gwadur* to *Mussendom*, successfully dropping the cable which was to form part of the great electric chain of communication—it may be, too, of civilization—between England and India.

Gwettur is a poor village of about 70 mat-houses and 250 inhabitants. It is situated near the north-west corner of the bay of the same name, hidden to the south-west by the rocky projections which separate it from the beach behind *Cape Farsa*. I arrived at about 3 p.m. on the 5th February, landed and after looking about me, sat down for a time with the respectable old men who are hereditary heads of the community. *Haji Morád*, *Bossolo*, and *Mithano*, are as patriarchs in this cluster of hovels. They received *Haji Abdú*, my guide, as an old acquaintance: my own reception was as cordial and friendly as could have been expected. One of the three brothers spoke Persian and Hindostani fluently, so we had no difficulty in becoming mutually intelligible.

Haji Morád pays 400 rupees per annum as farmer of the *Gwettur* revenues. But there is scarcely a bunnya in the town, nor a shop or storehouse. The inhabitants are called *Máda*, *Darzádus*, and *Raises*. The fisheries may be considered to be the only true source of revenue, and I noticed some boats in the mouth of the little *Gwettur River* below the village. Some also were sailing about the bay. No wish was apparent to conceal from me the politics of the country. While sitting together in conclave on the mat outside their door, the old men spoke to me with freedom, and heedless of the many listeners grouped around us. The village was both dirty and desolate, and my stay there was not prolonged.

From *Gwettur* we made a splendid run across the bay. Its northern shores are remarkable for the *Bahn River*, traced in the distance by dark lines of mangrove, the *Derembah Hill*, and the *Dusht Khór*, situated between the *Derembah* and *Jevut*.

Passing Glunse and Pishkan during the night, we reached the gun-boat (*Cyde*) at Gwadar at an early hour on the morning of the 6th February.

Deferring, for a future occasion, the narrative of some weeks spent among the Arabs on the opposite shores of the Gulf, and at Fao (or Fava) near the mouth of the Shatt ul Arab, a month at Baghdad, an overland journey from Baghdad to Izmud, on the sea of Marmara, a residence of some months in Turkey, and a journey from London to Teheran, *via* Russia and the Caspian, I will now come to the past winter. At this period, after an experience of four months at the Persian capital, I was preparing to return to Irak by a route little frequented by Europeans — but one which I had long contemplated taking, should opportunity offer, to enable me to complete my reports on Belucistan, and supply the requisite information west of Cloubar. I could now attempt to reach that part from the Persian side, and with the knowledge and consent of the Persian Government. A route for the Indian telegraph was required in that direction as an alternative to the submarine cable, and no such route could be determined without sure and personal knowledge of the country to be traversed.

I was fortunate in obtaining, as a companion for the greater part of this journey, Major Murdoch Smith, of the Royal Engineers, an officer who had done good service in restoring many valuable antiquarian relics both in Asia Minor and on the north coast of Africa. His labours in the last-named locality have resulted in the beautiful collection of Cyrene monuments now exhibited at the British Museum, which will, it is hoped, become better known when better accommodated. It was arranged that we were to proceed together as far as Kirman, and thence to take separate routes — he to Bunder Abbas and the coast, and I to Rampur and the interior of Mekran.

We left Teheran on the 4th December, 1865, meaning to make our way to Ispahan, about 200 miles, as quickly as possible. So much has been said and written about "Chappur" rides in Persia, and this particular section of the country has been so often and so well described, that I will not dwell upon the part of our journey performed with post-horses. But travellers require an amount of patience and tenacity of purpose for these things far beyond the scope of what is usually considered "roughing." It is all very well to imagine oneself galloping along at the rate of 10 miles an hour in a fine bracing climate, pulling up at a post-house, and dining and sleeping as well, through hunger and health combined, as at the Mirabeau or Clarendon; but there is another feature in the picture which should not be forgotten.

You ride with your kit, or a great portion of it; you are not actually compelled, it is true, to carry books, bedding, and beer, yet are they very acceptable accompaniments when the ride is over, and worth a little temporary additional inconvenience; but there are other articles which climate and circumstances render indispensable, and these are not favourable to speed or comfort, especially when the rider is rather heavily attired in respect of cap, coat, corderoys, and boots. Then it is to be borne in mind that the horses are not necessarily fast because used for posting. Some move along heavily and lazily from first to last; some require great tact and effort to be brought into action at all; and some have actually no go in them. Nor is it uncommon for the "Chupper" horseman to get a cropper. He should avoid all sudden rises in the road, because the descent is dangerous to the "Chupper" horse in motion; and this course, difficult at all times, is at night impossible. My comrades and I rode animals of all kinds but were, upon the whole, fortunate. Indeed, our last day's ride took us about 60 miles into Julfa, the Armenian suburb of Ispahan, by mid-day or in time for breakfast.

At Ispahan we were detained about a week, and thence commenced our march, by comparatively easy stages, to the eastward. Accompanied by five Persian servants, we had not much to apprehend as regards physical wants or privations, at least within the limits of acknowledged Persian territory. However merciless in extortion and determined in falsehood, the Persian servant, in his own country, displays a surprising amount of zeal, energy, and activity in his Peringhi master's cause. He ignores all prejudice—knows no difficulty of service: it is only when he finds himself among strangers who cannot appreciate his authority, that his heart fails him, and he sinks to the level of ordinary humanity. Among those who now attended us, one, a "pahlivan," or wrestler, was a fine specimen of his countrymen, most assuredly the handsomest of all Oriental races.

Major Smith's Diary is part of the Government Records, which will, I doubt not, be made available for general reference. My own will be placed at the disposal of the Royal Geographical Society. Availing myself occasionally of the former, I will now briefly describe the route from Ispahan to Kerman, and any remarkable features or places in it.

"The road from Isfahan to Yazd consists of three natural divisions. 1st, 50 miles or nearly so in an easterly direction, over the flat plain of Isfahan; 2nd, 30 miles in the same line on ever rising ground, the continuation, evidently, of the great range of hills that passes by Kenna Kaslan, Komsal, and Naderz; and 3rd, 120 miles in a south-easterly direction over an offshoot of the great plain of Kerman. Coming from Teheran to Yazd by Isfahan, one is consequently obliged to cross the Kohrud range twice, first at

Kohrud itself, where the hills are high and rocky, and frequently impassable from snow in winter, and scarcely 50 miles to the southeast of Isfahan, where they are much lower and less precipitous, whereas the direct road from Teheran by Kashan and Naf is over one continuous plain."

We made out the distance to Yazd in ten marches. The weather was for the most part favourable, but at times bitterly cold. Cultivation is sparse and uncertain, population scant, and traffic of no great account, though continuous. There are signs of life and agricultural activity as Yazd is approached along the Kashan road. At Maibut, where we passed our Christmas, the soil is good for building and pottery. I bought some samples of the latter, which resembled the common Indian "kuza," or earthenware water-jug. In this neighbourhood are clusters of large villages, such as Ardekoh, Batrob, Ah medabad, Surfabad, Turkabad. The view of the hills on either side here becomes worthy of note. On our right they are but a few miles distant, and we open out a new and picturesque range as we advance. On the left they are separated from our road by a desert plain, some 50 miles in breadth. Sloping upward from a low valley like the bed of a river, they rise gradually on the farther side into regions of snow. I never saw scenery of this kind to greater advantage than when watching the higher of these mountains an hour or two before sunset, as we entered Maibut. The clouds had cleared off from the crest, and left it to stand out in exquisite relief on a soft Persian blue sky; but below the crest was a belt of dark cloud like Saturn's ring. The base of all the hills, again, was more or less covered with mist and snow. The effect was grand; and, as the sun got lower, a lurid red glare fell upon the scene, which varied it agreeably.

The fine solid caravanserais of Shah Abbas on this road are remarkable structures. Their use to merchants, pilgrims, travellers, and wayfarers generally, is, indeed, great, and as architectural monuments they are worthy of any age or country. In contrast to these noble works of an enlightened monarch are the many ruins resulting from the invasion of Mahmoud the Afghan.

Yazd is a large town or city, situated in a sandy plain, high and open, between two ranges of mountains, running from north-west to south-east, as a general direction. To the westward is the open country from Kashan: eastward, an apparent desert, dividing Yazd from Seistan, and little traversed by man or beast. On the south the mountains can boast of peaks towering to some 7000 feet above the plain: sharp, bold, rugged, and fantastic; tipped, tinged, or covered with snow, according to nature or position; presenting at all times a beautiful view, and worthy of

more notice than a faint line, or a blank in our best of maps. Yazd may have about 40,000 inhabitants, of whom 3500 are Ghebirs or Parsis, and 1500 Jews and non-Mahomedans. There are 17 Hindus only; but this number is sufficient to show that toleration is practised to some extent, without respect of race or creed. Silk is here manufactured, the raw material being obtained in the neighbouring villages; but it is probably inferior to that of Ghilan. It is an article of export, as also henna, dyes, cotton, and namunds (felt carpets). Wheat is imported, although cultivated in patches around and near the town. The streets are wretched and blank, like those of most Persian towns, but not especially dirty. There must be about fifty mosques, of which the Juma Musjid has a fine high frontage, overlaid with the pretty blue tiles so common at Teheran. The supply of water is precarious, and depends on the season. If snow or rain be plentiful it is well for the inhabitants; otherwise there must be scarcity. The merchants of Yazd seem to be an enlightened and enterprising class. We made the acquaintance of their chief, called the "Mullik u Tujar," a very fine old man, with an aquiline nose and sharp twinkling eye, wearing a large becoming turban. They informed us that their dealings were not confined to Bombay and India, but extended to the Mauritius, Batavia, and China. I quote some passages from Major Smith:

"The greater part of the town is built outside the city wall, and the Governor lives in a separate fortified enclosure of his own. As in almost every town in Persia, there are superintendants. The inhabitants account for this, first by the Afghan invasion nearly 150 years ago, and more recently by the rebellion of one of its Governors, whose history is perhaps sufficiently interesting to be shortly related.

"During the reign of Fath Ali Shah, in the beginning of the present century, Yazd was governed by one of his numerous sons, Mahmoud Wali Mirza, who, in course of years, had amassed an unusually large fortune, even for a prince. Called, probably on this account, to Teheran by his father, he left his government, his harem, and his money in charge of his Vizier Mirza Abdul Reza, who, during the absence of the Prince took possession for himself of all that had been entrusted to him, raised an army, and became Vakil or rebellious. The Shahzadeh on his return from Teheran being refused entrance, brought a force and besieged the city. After a long defence, during which the city was almost destroyed, Abdul Reza was forced to flee, first to Kirman and then to Meshed, where he took but a short sanctuary in the sacred shrine of the Imam Reza. Here, of course, he might have remained in safety, but he was induced by Abbas Mirza, the heir apparent to the throne, to leave a refuge and tarow himself at the feet of the King. Disregarding the promises of forgiveness held forth by his son, the Shah ordered the wretched Vizier to be given over to the vengeance of the harem, he had dishonoured, when the women, armed with bodkins and scissors, speedily put him to an ignominious death.

"Nothing could exceed the civility with which we were treated by the Governor, Mahamed Khan, General Adjutant (as he is called) of Persia. On

approaching the city we were received with an *Isikhthal*, or reception, by a large party of horsemen and soldiers headed by the Governor's standard, whom he had appointed our *Mehmandar* or host. More soldiers and *ferashies* were sent to escort us through the bazars, which were crowded with people to see the strange Persians. The house assigned us for a residence was the palace of the very Mahomed Wakh Mirza whom I have already mentioned. Here we were entertained during our stay in Yazd by our *Mehmandar* as the guests of the Governor. We called on the latter twice, and found, not a little to our astonishment, that he spoke French, and had visited almost every capital in Europe. When tea was brought he remarked that, as Europeans, we would no doubt prefer beer, and a bottle of 'Aisopp's pale ale' was immediately set before us.

"The distance from Yazd to Kerman is 240 miles of good level road over a continuation of the same plain as that between Yazd and Khashab. About half-way the road turns from a southerly to an easterly direction, the last three stages being on the road from Kerman common both to Yazd and Shiraz. The greater part of the way the country is perfectly barren and desert, although great improvements have of late years been made by the present Viceroy of Kerman, Mahomed Ismail Khan, better known by his title of Wakh-i-Mulk. He has laid caravanserais and made reservoirs in low water in the places where they were most wanted, and has encouraged others to follow his example."

Of the twelve stages into which the road was divided the first, Mahomedabad, is a long street of low houses, with a row of mulberry-trees on either side, and many watercourses. There are gardens around, and the country is well cultivated. Judging from the number of spectators assembled to stare at us (and every available man, woman, and child, must have been turned out), the inhabitants should not be much less than 100,000. Our host to-day was the son of a noted Yazd official, styled the *Nazim u Tujjar*. He was a respectable, portly youth, and entertained us in the usual hospitable manner. Some notion of the dinner, when we chanced to be received as guests at a Persian's house, may be gathered from the following bill of fare, which I find carefully recorded:—Rice in profusion, and well boiled; fowl stewed with prunes; minced meat; the same fried in flat cakes; pigeons and game birds swimming in grease; chickens roasted to chips, salt and dry; scraps of good cheese with herbs and excellent fruit. On one or two occasions we had soup which would have been good if warm. Few large towns in Persia but can furnish drinkable wine, and trays of sweetmeats in variety and profusion are seldom wanting. At Yazd I counted no less than twenty-three plates in the antechamber; while the apples, pears, oranges, and pomegranates, might be reckoned by hundreds.

"*Sir-i Yazd*," our second stage, is the boundary village of the Yazd district. It has a good caravanserai, and the ruins with the background of hills are picturesque. "*Zamin Din*" is but

a caravanserai and post-house; the first a solid hexagon of burnt brick, well fortified, and almost luxuriously constructed for public convenience. It is of the time of Shah Abbas, but the dilapidations do not appear to be the result of age. Assaulted by Bukhtiaris, and possibly other robber or hostile tribes, its strength has prevented more than partial injury, and it might still be turned to account for the defensive purposes of which its thoroughly isolated position is suggestive. "*Kermanshahan*" is much the same as *Zainu Din* only the caravanserai is a new building. The next place, "*Shams*," is even more desolate than the two preceding stages. Its post-house had been broken into not many months before our visit by the Bukhtiaris, and was doorless and empty; but we found tolerable shelter in an old fort. "*Anar*" is rather a picturesque village in the distance, and quite an oasis in respect of cultivation and the necessities of life. "*Beyaz*" has about twenty houses, an avenue of trees, and a new caravanserai. "*Kushkuh*" may be recommended for its excellent bread and water. The ninth stage, "*Bahramabad*," is the centre of a comparatively flourishing group of villages, and shows signs of progress and prosperity. Wheat, cotton, and castor-oil, are abundant. It may be mentioned as a remarkable instance of the effect of the late commercial crisis upon these out-of-the-way parts, that the price of cotton had gone down about 70 per cent. on its value a few months before our visit. "*Kebuter Khan*" and "*Bughin*" are respectable villages in their way, but need no particular mention. The next stage is "*Kirman*," regarding which, and the road in, I will again quote from Major Smith's Diary:—

"Somewhat to our astonishment we found Baghin actually to the southward of Kirman, which quite accounts for the mistake made in the maps. In most of them the roads to Shiraz and Yazd are marked as quite distinct, whereas, for the first three stages, they are one, and only separate at or near Kebuter Khan. The maps have evidently been drawn from verbal report, as the three names of Baghin, Rohat, and Kebuter Khan, with eight variations of spelling occur on both routes. Four or five miles from Baghin, the road, after a gradual ascent, reaches the point of the Duzuran ridge from which it descends into the plain of Kirman, leading to the city in an *N.W.* direction.

"Three or four miles from the town we were met as at Yazd by an Istakhsar sent by the Vicer, the Waki-ul Mulk. A comfortable house was assigned us next to his own, and a Mehtaradar appointed to attend to all our wants.

"Kirman is situated in an extensive plain, but in the immediate vicinity of very lofty mountains. The climate is said to be exorbitant, neither very cold in winter nor hot in summer. Its height above the level of the sea I should estimate at about 5000 feet. The city in many places is a mass of ruins, caused, I believe, by the civil war on the accession of Akbar Mahomed Khan, the first of the Kajar dynasty. Kirman, like many other places in the south-

of Persia, followed the fortunes of Lutf Ali Khan, the representative of the Zerd family. After a painful defence, Kerman was taken, and almost destroyed by Agha Muhammad Khan, into whose hands Lutf Ali Khan's son after fell not far from Bam. Much has, however, been done within the last seven years by the Waki-ul-Mulk to restore the city. The walls have been repaired, new gates have been built, and inside the town bazars and caravanserais are in course of erection. On the southern side of the town is the Ark or citadel, in which the Governor resides. It is a complete enclosure in itself, although the inner wall of the Ark is also the city wall.

"During the four days we remained at Kerman, we went to see the carpet and shawl factories. The carpets are the finest in Persia, and the shawls are considered next in value to those of Cashmere. Both are made entirely by hand, without the use of even a shuttle. In making the carpets, the threads (all of one colour) forming the length of the web are stretched in an upright loom consisting of two horizontal rollers. The cross coloured threads that form the pattern are worked in by as many small boys as the breadth of the web will allow to squat in front of the loom. As the work progresses the web is gradually rolled up on the lower roller. After two or three rows have been woven, wadestaken combs are inserted in the web and hammered down with a mallet to make the carpet close and firm. The master weaver draws and colours the designs on paper, used to represent the different threads; after which he teaches the pattern to the pupils, who commit it to memory. The shawls are woven in a similar manner, almost the only difference being that the beams, or rather frames, are horizontal instead of upright. The memory of the workmen cannot possibly be assisted by seeing the pattern develop itself, as they always work with the reverse side of the web upwards. The handicrafts or workshops in which the weaving is carried on, are not only dark and smoky rooms that one cannot but wonder that they should produce such beautiful and intricate work. The shawls vary in price from 2 to 40 toman (or 230), and fine carpets cost as much as from 4 to 15 toman the square yard. Very few of the finer sort are made for sale in the bazaar, almost all being made to order for princes in all parts of the kingdom. As in the matter of Koork, the Waki-ul-Mulk does a good deal of 'rejanet' on the same principle in shawls and carpets. The spinning and dyeing of the wool for the carpets and the koork for the shawls are also carried on in Kerman, which thus produces the raw material and completes its own manufacture.

"The principal trade of Kerman is much less than that of Yazd. The chief export is Koork (which is sent by Bunder Abbas and Kerman to Cashmere), wool, carpets, and shawls, cotton to Herat, and grain to Yazd, which does not produce enough for the support of the inhabitants. The imports are chiefly cotton goods, sugar, copper, &c., from India. Once or twice a year caravans come from Herat and Kandahar.

"There are few gardens near the town, but abundance of fruit is brought from Klubbeh, a town on a river 15 farsakhs (50 miles) to the north-east, wrongly marked on the maps as 15 days' journey.

"A mile or two to the east of the city is the ancient Gueber stronghold called Kaleh Dekhter, or the maiden fort, built on a high rock. We were unable from want of time to visit it."

My fellow-traveller and I were to part company at Kerman, but the good old minister, to whom we thought best to trust our travelling arrangements, decided that we should proceed together yet further to the eastward, separating at Sabristan. The distance so traversed was about 100 miles, divided into five

stages. The first day took us to "*Mahin*," a populous village with many gardens, situated at the foot of hills. This place is famous for the shrine of a Mahomedan saint named Nyamat Ullah, whose prophecies were much talked of in India before the outbreak of the Mutiny.* Our second stage was "*Hanaka*," a dreary caravanserai amid snow-covered hills, a continuation of the Jafar range, running south-east of Kirman. The next stage, "*Rayun*," was reached after a march of 26 miles; 16 of these over snow-hills, and 10 across a stony plain, in which, however, a decent road had been made by the Zabit of Rayun for some distance out of his village. This is a large, populous place, and has many fine trees, such as the sycamore and walnut. Heavy snow detained us for a day here, after which we moved on a long stage over a large, open, gravelly, and slightly undulating plain, between the never-ending hills, to "*Tah-rad*," literally the "bottom of the mountain stream." From Tah-rad we proceeded over rough, broken ground for a few miles, till we reached a fair road leading into "*Sabiristan*," where was a caravanserai.

On the morning of the 21st January, Major Smith left me to make the best of his way to Bunder Abbas. I may here mention that he performed the journey within a fortnight, reckoning the distance at 270 miles. Deep snow, mountain torrents, and heavy rain, presented obstacles to his progress in a rugged and difficult country. He speaks in high terms of the kindness and courtesy of the Governor of Jiroft. This chief is a grandson of the old king Futteh Ali Shah, whose descendants are scattered in almost every part of Persia, filling offices of every description.

At Bunder Abbas Major Smith was joined by Mr. Vice-Consul Johnston from Busora. They went in the steamer to Jashk, where they landed, and examined the coast up to Sooruf, a distance of 67½ miles—described as a "flat, uninteresting, and generally desert strip, varying in width from 1 to 15 miles, between a range of hills and the sea." At one place, however, a low sandstone spur of this range crosses the path, "which passes through a gap at an elevation of about 40 or 50 feet from the level of the plain." They also landed and conversed with the inhabitants at Tenk, an insignificant port between Sooruf and Chobar.

To revert now to my own route. But five or six stages remained, and I should be out of Persia Proper, and entering Beluchistan. My suite consisted of Hashim Bey, the attendant

* The tomb is of marble, and the room in which it is seen is well set off by a beautiful carpet, made at the manufactory of Ustad Hussein, whom we had visited at Kirman.

deputed by the Wazir of Kirman to escort me to Bam, two Persian servants, one of whom was the Paldivan before mentioned, the muleteer, and a small boy who sat in a most elevated position on a well-packed white pony. A few extracts from my Diary will, perhaps, give the best account of the journey (see Tables at end of article).

In briefly reviewing the geographical results of the journey so imperfectly put before this Society, I would call attention to the useful work of Khanikoff, published some five years ago in Paris, under the title of '*Memoire sur la Partie Meridionale de l'Asie Centrale*.' The map attached to this volume is the true correction, though incomplete continuation of the Eastern Persia of English travellers in the commencement of the present century. My companion and I were ignorant of its existence as we journeyed along through Kirman; and Major Smith's remark on the position of the capital of that province entirely agrees with that of the Russian authority. We thought to find it nearly south, or at least south-east, of "Baghin," our eleventh stage from Yezd, and it was rather to the north of east. With the exception of Stanford's quite recent map of Asia, I know of none of our own, or the German maps, in which the same error is not found. The fact is, that the city of Kirman is very much more to the eastward, and less to the southward of Yezd than supposed, and the mistake has originated in the fact that the route from Kirman to Yezd, and that from Kirman to Shiraz, detailed in Kinnier's compilation, are one and the same for 40 miles, as shown by Major Smith, if not very much further; the first running N.N.W. or N. and by W., the second almost due west.

M. Khanikoff gives Mr. Aldott credit for having, by his journey of 1840, corrected the great error of making Kizabek a central point in the road between Kirman and Herat, and placing it at a short distance of three days from the former town. We were told at Kirman that it was about 50 miles off, and recommended to visit it on our way to Bam, as being the centre of a flourishing district. Though Pottinger mentions that it is in latitude $32^{\circ} 20'$, his map shows it in $31^{\circ} 45'$; but it is rather in $30^{\circ} 20'$. In like manner Yezd and Kirman are out of their proper positions, singly and relatively; as will be seen on reference to Khanikoff. I allude to this particular circumstance, not because we do not owe much, nay, almost everything, to Pottinger, for what we have known of Eastern Persia and Beluchistan, but because his map has been usually accepted in all its detail, and much of it was filled in from hearsay and native reports. Below Kirman M. Khanikoff does not proceed; nor

did, I believe, Mr. Abbott, to whom he honourably refers, go eastward of Bam. In moving from Regan to Bampur, I had the advantage of passing along a track different from that marked in Pottinger's map; and again, in finding my way from Bampur to the sea, I had a like advantage in being, for the most part, on a hitherto unexplored path. The new names of places and lines of route to be added to information already acquired may not be of very general importance, but they can, at least, be vouched for as true; for I have seldom attempted to determine a locality not actually visited. For many reasons it is not easy to make minute surveys or take particular observations in these countries; but I would hope that, as we become more acquainted with them and their inhabitants, we shall be able to obtain for Mekran and the upper regions of Beluchistan all the attention they require in these respects. Thus would the telegraph be productive of results perhaps just as important to us as rapid communication with friends and fellow-labourers in the East: and in this light I think that all will admit that the land line has greater advantages than the sub-marine cable, even though the last pursue its marvellous course hundreds of miles away in the depths of the unexplored ocean.

REPORT OF A JOURNEY FROM SAMNATAN, S.E. OF KIRMAN, TO UROCHAS, ON THE COAST OF BELUCHISTAN; VIA RAMPER
AND THE PASS OF KAPOCH.

Date, 1900.	Stage for the Day	Estimated Distance in Miles.	General Direction	Narrative; and Particulars of Route
Jan. 21st	Daman	18	E. by S.	Ground hard, gravelly, and tolerably level. Water abundant. Daman was once a large town, and is celebrated as being the place where <i>Farrokh</i> , son of Rustum, was executed. It now consists of a modern cantonment, erected within the last three years by the Vakil-ul-Mulk, minister of Kirman, and one or two other buildings on a smaller scale but much in the same style of architecture. A few widely-scattered ruins are all that remains of former days.
22nd, 23rd	Ram.. ..	17	E. by N.	Road good, over hard, gravelly plain, as yesterday, at first about 11 a.m., then nearly N.W. About 18 miles, a large earthy-looking village of 5000, on left, called <i>Kishkaran</i> ; on right, a kind of caravanserai known as " <i>Hal Askir</i> ." The town of <i>Ham</i> , a name corrupted from " <i>Hamman</i> ," its founder, is situated on a large and somewhat elevated plain between a range of snow-capped mountains at a considerable distance to the south, and low rocky hills a few miles to the north. The old city, now the fort, is a mass of ruins, but the wall is in a good state of preservation, and the citadel, with its lofty white tower, is a picturesque and striking object. Faint traces of the ruins of the capital of the <i>Afshars</i> , as it was held to be the frontier town of Persia on the south-east. The desert plain is now six or seven years old, and he speaks of the ruins as testifying to the existence of a much larger place. Since he wrote, it has been the scene of an international struggle which added to an earthquake, resulted in the almost utter destruction of the town within the walls. Nearly thirty years ago the Commander of the <i>Shut</i> a army besieged there the well known <i>Agha Khan</i> <i>Mahdi</i> then a rebel hero, the Governor of Kirman. The fort was held for more than a year against the royal troops. The shot-marks in the walls prove that the mortar was in constant use, but the capitulation appears to have been peacefully effected. I saw some ruins of fortifications. Estimating the houses to be about 2500, and the population 10,000, I should say that not a twentieth part of the town exists as it was when the walls were built. It seems to me that the ruins are the wall of the fort but the gates and bastions, with a few vestiges. However the

Kindness of the Governor of Kirman, he gave me an order in his own handwriting to the Commandant, I was admitted to an inspection of the fort, a really interesting illustration of Oriental architecture. Postinger mentions but one gate. That one is doubtless the same as that by which I entered, and leads by the main street and bazaar to the citadel. I am informed that there are two other means of access and egress, but saw one gate only. There is a large irregular ditch on each side, in conformity with the quadrangle of which the extent would perhaps be 300 yards for each face. The citadel appears to be partially built upon a natural rock, and is provided with a well of drinking water. I learn that there are two companies of infantry and a few artillery kept in garrison here. My impression is that these companies cannot be reckoned at their full strength, and that there may be twenty gunners. The towers were alive with red coats, and about fifteen artillerymen were drawn out, under a Nab or Lieutenant, to carry away as we passed towards the citadel, but what description of ordnance, if any, was under the large white cloth thrown over the two gun carriages, I cannot determine. The men were generally well dressed and smart looking for Persian soldiers. An instance of smartness may be cited in the first refusal of a company to admit me to the fort, without a written order. It so happened that we and walked away from our lodging without bringing the order with us. The sentry placed his musket horizontally across the half of the gateway which he could so protect, and his comrades filled up the other half. On my expressing apprehension of this conduct, one of our party came up and assured me that this "Yasur," or Major commander of the fort, was one of the first officers in Persia, maintaining that the proof of discipline just witnessed was the result of his efficient supervision. I paid a visit of ceremony to this headquarters. He was an unmistakable invalid, and had hobbled out to meet me at the citadel. There is a good deal of cultivation, and there are many enclosed gardens at Ban, and provisions of kinds are abundant. So far as I could judge, the inhabitants are in no way behind those of other large Persian towns in intelligence. Many roads or travel on the Indian road, but mostly to Bandar Abbas. I was recognised here by a follower of Mahomed Bakr, late of Kurraheen.

Our course is amid many scattered ruins, over an open plain, hard and gravelly; occasionally met ground with tamarisk jungle. At 3 miles from Kirman, a set of date plantations and small villages on either side the road. Left 3 miles and passed Isfahan at about 10 miles to S.W., and 3 miles farther, Kerk, to south. Range of small irregular hills on left, and prolonged higher range on far right. Atababad is a kind of fort, with court and out-buildings full of pear

REPORT OF A JOURNEY FROM SABBETHAS, N.E. OF KIRKMAN, TO CHOCOLAR, ETC.—continued.

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Over about 9 miles the jungle ceases, and road becomes stony. At 10 miles further enter the hills, another 4 miles bring us to the hot springs which give name to this halting-place. They are indicated by clouds of smoke rising

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REPORT OF A JOURNEY FROM SAMARKAND, S.E. OF KIRMAN, TO CHOPAN, &c. — continued.

Date, 1888.	Stage for the Day.	Estimated Distance in Miles.	General Direction.	Narrative; also Remarks and Notes.
Jan. 25th	Sairin Din	21	S.S. by E. 10 E.S. E. & S.E. then E. by S	<p>above the long grass and when the waters are choked No village or house of any kind here, and but few traces of habitation. The river is very slight, leaving the plain country. It is little more than becoming shut in by low, black, burnt looking rocks, some sharp and angular, some like long walls with flat tops. Drinking water procurable from hot springs. It is not rapid, but actually warm, almost hot, and when cooled is sweet and drinkable.</p> <p>Very stony for the most part, with occasional green and grassy plots, between low, black hills, some sharp and angular, some with long flat tops. The black rock is scattered about like coal broken up into small fragments. At 12 m. we, "Chah Kusbar," where we were to have halted, but at my instance we moved on to a fine grassy plain with rain-water, and covered with flocks of sheep and goats. This is called Sairin Din, and the "Gardar," or pass, of that name, opens out before us. Our object in pushing on is to avoid the rain, by which the mountain torrents may come down in sufficient force to delay progress. Occasional steeps and descents in the day's march, but all are comparatively easy, notwithstanding the many loose stones. A few sections of sheepfolds are about, but the want of population is undeniable. A Helook guide to take me that 180 soldiers had lately preceded us by this same route. They were on their way to Bampur.</p>
30th	Giran Kog	22	S.S. E	<p>Road generally very stony. Follow the base of the hills in a north-easterly direction for a short distance, and turn south-east and the pass. Ascent from pass not more than 70 feet, but steep enough to cause us to dismount. The black rocks are glaucous but picturesque. Here, regulated by the waterbed, is the boundary of Namashur, and commencement of the Bampur district. There is a fine view, on looking back, of the mountains and plains of Kirm. The descent to the great plain is short and easy. Move up as it is an angry thicket of low hills for about 7 miles, and a station reached, named by the Helooks, "Kirm." It is a very stony and sandy steppe, and the vegetation, except a few reeds,</p>

Cross and recross the Guran Beg River, encircling finally on its eastern side, and pass of the hills known as "Tahit's Nair." Ground stony, but many patches of mud and gravel with tortoisish jungle wild olive-leaf, and much desert vegetation. Water here and there in the bed of "Rudkhana," which is rather a mountain-torrent than a river. No sign of habitation.

At first follow the course of the Rudkhana over stony and difficult road, the track being sometimes quite lost. At 2 miles two streams meet it from N. or N.W. but we turn, or rather keep to the S.W. At 1½ m. after some rough marching, "Sir Nairan," a halting-place with fresh-brook ing streams falling over huge flat stones, water nightly toackish. At 3 m. Begun, see many the pheasants and flocks. Encamp in a kind of rocky recess like the bed of a torrent, full of tamarisk and ocander.

After 10 miles, passing "Chorn Baran" and black flat tundra, reach the Rudkhana of Khosru. Another 9 miles to Khosru Zol or Sol, at a single Eel-tree. Another 2 miles the tamarisks of "Luddi." Road at first very stony but improves at Khosru, where we turn off from the hills into a more open country, and meet one or two small Kalasas. On leaving Khosru, come upon a large, high, stony plain, which a close gradually downwax, and improves as it becomes lower, vegetation being less sparse and more healthy. Luddi is in quite a forest of tamarisk and thorn trees, so me of fair size and appearance. We camp also near Luddi. Had some trouble in finding rain-water, but a supply pointed out to us by a shepherd's boy. Flocks here numerous, and good grazing for camels. The day's encampment is compared to the dreary and desolate hut, black bird left bed and. The poor little's sheepskins here, though rough outward specimens, seem civil and well disposed. Rain at night.

To-day's encampment much like yesterday's, among tamarisk-trees and on sandy soil. There is no want of grazing for herds and flocks, and from what I can learn, rain is pretty regular here at this season. The Kharman Hill seen from Begun to the eastward now stands out N.W. by N. & N. Its shape and snowy crest make it a picturesque object.

1st	Guran Beg	20	N
Feb. 1st	Luddi	27	S.S.E.
2nd	Kalanaso	14	S.S.E.

REPORT OF A JOURNEY FROM SAMARKAND, S. P. OF KUTMAN, TO CHUMBAR, &c.—continued.

Date, 1903	Stage for the Day	Estimated Distance in Miles	General Direction	Remarks and Particulars of Route
Feb. 2nd	Ch'ah' Shor .. Ch'ah' Jukak.	22	N.	I mention both names, for the first appears in the German map of Masdke and Leo. There is now no well there; so we moved on about a mile further and halted at one indicated by our guide. The water, however, was so putrid that we could not drink it. Better was shortly found in the vicinity. Jungles not so thick as before, and soil more sandy. No pools of rain water visible, as at Luddi and Kalasman.
4th, 5th	Kuch Girdan ..	25	E.S.E.	For 3 miles our course was observed to be E.S.E. We lost our path; and our guide, instead of seeking to regain it, started off to find an upper road, which we were to have reached at a later period in the day or week. This error and is that taken by the troops, who are reported to have been yesterday at Kuch Girdan. We reach it after some 2 miles, and see distinctly the track of men and cattle. At 4 miles farther a well, but we passed also two or three at intervals. Another 14 miles bring us to our halting-place among fine arge tamarisks near a Kachkama which, if not the "Har-pi" Lake of the map, is a branch of it. The detachment had left this morning and were today at Casmanabad, 3 miles from Kuch par. Thence? No 1 wrote to Ibrahim Khan, at conducting our army and thus far. Some of our camels failed in coming up tonight. Roads heavy. The country is still the same last plain between Masd-ke and us. The ranges to the north are probably 120 miles distant from those to the south, and beyond the latter a Makran entered only at certain seasons; all difficult. Observed today fine specimens of the "Kerit" or wild caper.
6th	Bamgar	16	E. & N.	Camels failed to halt on the 5th. Towards morning a damp mist rose with a high wind, which lasted the whole day. Our mules & camels came up late, late our reported to have failed. Heluch culivators here have been transported from Narmader beyond the border. They are not a handsome race, have an African cast of feature, and talk semi-comprehensible Persian.

Crossing the Rostam nullah on the way, proceeded about 7 miles to Chumbar, a Persian village with farm land, the inhabitants of which had left the area and the land was left to the government. The land was then planted with wheat and cotton, and the government had a great number of soldiers and officers of the army.

plexioned race, recall to mind the squaws and w-gwams of other climes. My own horse having a sore back, I was pained to avoid myself of a good riding-camel sent out for me by the Sorbung who had just marched into Baupur. Halted for a few hours at Casanabad in a neat and roomy hut, made of sun-dried bricks, mud, tamarisk-trees and like rude materials. Road wady and heavy, through loose jungle.

According to the programme of my guide, who was in communication with Ibrahim Khan, I had to leave Casanabad for Baupur at about three o'clock p.m. Shortly before reaching the latter place, I was met by the Naib Sulaiman Khan, Mirza Khan a chief resident of near Mirab, and several followers. Many Baluch horsemen joined in the retinue, and the Persian troopers performed clever skirmishing exercises. A horse had been sent me by the Sorbung to replace the camel ridden in the morning. To save time, and avoid the discussion so important to Persians as to who pays the first visit, I rode at once into the camp and lodged at Mirza Ali's tent. He received me very cordially, and we were soon joined by Ibrahim Khan and others. Matters did not, at first, look promising for my journey to the coast. The Sorbung was evidently inclined to do all I asked. He knew that his father had meant well to us, and had, at his father's written request, asked to see a letter addressed to me by the old Wazir since leaving Kirman. This letter was in reply to one of my own in reference to statements made by a certain Mirza Mahomed Ali, whose veracity I had reason to doubt, and was couched in terms of marked friendliness. But the young Sorbung was only the nominal head in the present case. Ibrahim Khan was the man to decide on the propriety or otherwise of my journey through Mekran to the sea, and I knew that Ibrahim Khan had formerly shown to us, I openly hostile to British interests as Gwader. Still there was something I did not dislike in the chief of Baupur. If a tyrant and a braggart, such a character was rather a development of the nation than indicative of the race. Whereas pliancy of speech and absence of compliment were characteristic of the race. As Ibrahim Khan was path-spoken and understood well set phrases, Sulaiman Khan has told me as we rode in the country about Kasrabad was in a disturbed state. I had heard the same story at Kegan, and elsewhere, and the account was now confirmed. It was clear that I was not to go the direct route, either by Cash or Kasrabad, to Chabahar. I suggested the road to the eastward, or to Sorbat, in Persia. Mirza Khan, from whence I could proceed due south to Gwader. Ibrahim Khan said he would send me there. If I wished, but once across the Key frontier, he could interfere no further. From all I could gather, he was not at feud with Faquir Mahomed of Key, but he had no wish to enter into communication with him, nor could

REPORT OF A JOURNEY FROM SAMARKAND, S.E. OF KIRMAN, TO CHOUREN, &c.—continued.

Summer 1866.	Stage for the Day.	Estimated Miles.	General Direction.	Narrative, and Particulars of Events.
				<p>their relations together be particularly intimate. It occurred to me that going over to Fouqir Mahomed against the wish of the Persian authorities, or, rather, at my own independent suggestion, might offend, if it did not excite suspicion, — so I said I planned to go to the southeast of Mekran, the route was immaterial. Ibrahim Khan then offered to send me to Tenk a little fishing-village west of Chouhan, where I could get boats to Muscat, and on this understanding I left the tent. Shortly after, an old Persian came to me from the camp, and with him I compared the matter, arranging that we should take the Tenk road from Kargur, but turn off to Chouhan before reaching the sea. This suited my purpose in two ways — 1st. It enabled me to ascertain how far Persian control was exercised in the country bordering closely upon Gakh and Karkand, under Mir Abdulah, the British Governor of Mekran, and, finally, it led me through the Pass of Pasoch, hitherto unexplored by any European.</p> <p>The next morning Ibrahim Khan visited me in person. In the afternoon I returned his call, and then I was visited by the Sirheng accompanied by the engineer Mirza Mehdi and others, and revisited by Ibrahim Khan. The latter was usually absent and reserved in the presence of the Sirheng, and not very communicative as to his own quarters, but had much to say in his own rough manner, if applied to in the way of business.</p> <p>The town of Ghumfir, independent of the Persian garrison, may contain from 400 to 500 houses. With the exception of Ibrahim Khan's house, and one or two other buildings, all are built on a level better than Beluch hills. The fort is a conspicuous object, built on a steep irregular low mound. The higher or northern side borders the outlet, from which it would run down in an irregular line from north to south. There are soldiers and guns within, but the Sirheng's detachment is encamped on the plain outside. I am located in a fine large garden of recent construction, walled in and rich with date-trees. It has also a few <i>Acacias</i> and a specimen of the "<i>Acacia</i>." Precious appear good and abundant and water is procurable from the neighbouring wells.</p>

tro between Bamper and the sea, has often been to Western India, and is comparatively enlightened. By his own account, he holds the appointment of Collector of Feroz; and no doubt he is employed by the Bamper authorities in the collection of its revenue. Though I could have wished he had given me more reliable information on the names and status of the Baluch chiefs and which the *Wazir* *Mekran* with his detachment, I cannot but acknowledge has thorough loyalty to his own government and undiluting nationality. In spite of years, he is hardy and active, like most of his countrymen who earn their bread in the saddle.

After Casanabad, to which place we returned before taking the road to the southward, the country today is fitter a desert than any I have seen in these parts, yet no more meeting that resignation than Sind, which is somewhat resolute. The *Wazir* *Mekran* are, however, few and far between, and never succeed one another with the regularity of ocean waves, as between Rohri and Jeddah. Half a day beyond a range of these; but I could not find a trace of the well and to mark it. Ground here a little harder, and vegetation more generous than before.

I am unable to find that any English or European traveller has ever preceded me in the route now followed. *Wazir* *Mekran* meet me by Girat is to the south of our position of yesterday. Today we leave it to seaward, after proceeding some 24 miles south by east. At about 11 miles, came upon a village of Baluch, near a well and low trees. We alighted in the immediate neighbourhood, and received a visit from them. The *Wazir* *Mekran*, fresh, better, and water were unexceptionable. At 4 miles further we came to some date trees and a pool of water in high ground. Saw here a woman dyeing cloth. The dye is procured from the bark of the date-palm, mixed up with clay and water, and is almost black in colour. The sandhills become less obstructive as we approach the Mokran Hills, and the road is tolerably good on harder ground.

Makran is a poor village with few inhabitants, but has, doubtless, seen better days. It is situated near a detachment on the east, bank of a large, broad, and now dry *Rudkhana*. Besides the usual Baluch huts, it has its mud-fort, and, indeed, a second one in ruins. I am told that not many years ago these two forts, which are close together, were at war, and each assailed the other with stones. It is probable that the sequel to the story would tell of Persian interference, and the removal of the more dangerous of the combatants; for Ibrahim Khan certainly destroyed one of the two forts. Small pox, and, more recently,

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REPORT OF A JOURNEY FROM SARRISTAY, S. E. OF KIRMAN, TO CHUGHBAR, &c.—continued.

Date, &c.	Stage for the Day	Estimated Distance in Miles	General Description	S. S. W. S.
Feb. 10th	Fanooh	26	Narrative, and Description of Route.	<p> Rain last night, but the weather again today. Road hard and stony, or sandy and gravelly, intersected with many beds of strata and small ravines, and straddled here and there with low black rocks or boulders. About 7 miles our road joins a second stage from Kalauzan, my stage of the road instant between which are Fanooh are three stages. At 11 miles a little lock on which is a "bungo," or square of low stone walls, thrown up for defensive purposes. My old Persian guide informed me that the grandfather of a British horseman who accompanied us, had here successfully raised a force of 3000 Measul, the Banpoor chief of Pottinger's time, but that the poor man was afterwards killed in a similar affair elsewhere. A mile further, a large Kulkhana, called K'mani, with delicious water. This river runs here in the plains after heavy rains, and winds into the pass of Fanooh; thence finding its way through Western Mekran to the sea at or near Koljo. Near Fanooh I observed on one side of our road some curious patches of light colour in the darker soil. These were explained to me as the "Pia Daidai; Ali" or footmarks of the horse of Ali. They may have been 3 or 4 feet in circumference perhaps more. Fanooh is a comparatively large village in the plain north of the Mekran Hills, and close to a pass bearing the name which ancient Mekran from the Persian district of Bamper. The fort is in ruins, and appears quite uninhabited. There are about 100 houses, and probably 500 inhabitants, all of whom are slaves. A village called K'ona, about 7 miles to westward, pays tribute of 1000 to the two-thirds of Fanooh, and the whole is governed by a Persian chief, for Chahar Nharui, grandson of Saad Mekran, was, until lately, ruler of Fanooh, but he has been removed to the more important post of Sarbaz. His father, who was at Fanooh and was brought to me here. He is a well-to-do man of about 60 years, speaks the Persian and evidently trusted in complete submission to Persia. I gave him a silk scarf, of which he seemed proud and somewhat vain, and found his lively remarks of agreeable tone. His slaves here are to great numbers, and there is cultivation to some extent. </p>

Enter the Farach Pass into Mekran, and move for some distance through a barren, desolate, with nearly perpendicular cliffs on either side. But the road, however steep on the good, was not so much an obstacle to our camels as the water, which in some parts was very deep, and had reflected in occasional scarcely fordable pools. Nor was it always practicable to avoid these. At 13 miles, defile, which had been improving, widens to open spaces with view of distant hills, thence narrow and walled again, 3 miles further Dahan, not a variable from road, owing to trees. About 2 miles from Dahan is the Honk Hill, at foot of which is the village. We left it to the right and slighted near some scattered trees beyond. My guide stated that Dahan had been quite depopulated by the late cholera visitation, there being some 13 families left out of 100. I would hope that this was an exaggeration. At Dahan about 200 persons are reported to have died. I spoke to a fine old Beluch on the subject, and learned from him that the cholera had ceased to rage for the last 3 months. There is a fort here the chief of which is quite a young man, son of Ahmed Khan, deceased. The village is populous, but I have no great authority on which to suppose a number. There should be no less than 2000. Our camp today was almost wholly along or beside the bed of the Farach River, which now carries its name to Honk. We met an unusual number of Beluch men and women, all engaged in locust-hunting. They had come down the river several miles from Kuch, to take advantage of an incursion of these creatures, which my Persian domestics as at once a calamity and a benefit. The Beluchas boil and eat them.

A long march of 12 hours today of which the first 6 were spent in following the course of the Farach River, which now changes its name to Kerkutan, and unites with the Dashtian. The second half was for the most part over a wild rugged country, and hills such as I had seen daily in Kas-er-er-Sickran, and with few traces of habitation or life of any kind. It is so uncommon to find in this land to march 20 or 30 miles without meeting a human being or even a quadruped, and in this direction I can testify from experience on either side of Kas-er-er-Sickran. Passed today a block of white stone, which had been scooped out at the top, like an amphitheatre a natural. It is reported to be by the Mahatras, because the power from the stone is considered an infallible remedy for toothache. Passed also the "Fir Ah" or a rock cleft in twain by the prophet's son-in-law. Legends of Ali abound throughout Mekran. The marks of his foot or the whinders of his sword are described in all parts of the country. And a

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place without saying there his offerings, or would think of reclaiming any money or property accidental y dropped there; that if a traveller, halting there for the night, burns the wood and gives his cattle the fodder from a pile on the spot, it is well with him, but if he should take the wood to burn elsewhere, it would be impossible to light it, or if he should cut and carry away the grass for consumption elsewhere, it would kill the animals which it was intended to nourish.

The 5 miles were not done, moreover, in one march, for we were informed before arrival at the Khor that it was not to be forced. Put up exceedingly near a Beluch 'dowari' and made a second march after mid-day. After reaching the bank of the Khor, we found the ground so soft and untenable, and the force of the current so strong, that we were obliged to abandon the attempt to cross to-day. This river comes down, it appears from Gadh, whereas the "Tenk" is from a point in the westward of that town. But the latter has by far the finer bed, nor did I see anything like its steep banks at the Khor-i Kar.

Crossed the Khor. At 16 miles, Khor Sangam, coming from the hill of Bushiman, which was forced with comparative ease. Passed on the way some Beech-trees within walls, in good preservation; also patches of cultivated ground 16 miles further the sand-hills of Parag, where there are a few huts. Country difficult to traverse in parts, from water. Road at one time among low hills and rocky ground; at another, over alluvial or sandy soil and mud low, scattered jungle. From Parag to the top of Tar Hill, between Tar and Chohbar, is about 9 miles, and thence only 7 to the latter place. We had seen the smoke of a steamer in seaward, and were desirous of completing our journey, but night had set in, and the path was lost. River crossed therefore for the night on the heights above Chohbar.

Descend the hill to Chohbar, where I was received by the Wali and Ismael with much cordiality, and at once recognised as an old acquaintance. They accompanied us to the steamer, and we gave them a few trifling presents. Joined here by Major Smith, Lieutenant Saffie and Mr. Johnston, with whom I proceeded in the *Amersbach* to Gwadar and Kurachi.

15th	Khor-i-Kir ..	5	E.
16th	Tar Hill ..	49	S.E.
17th	Chohbar ..	3	S.
Total miles ..		516	
Add from Teheran to Sabirvan		811	
Total from Teheran ..		1327	

XV.—*Report of an Expedition made into Southern Laos & Cambodia in the early part of the year 1886.* By H. KENNEDY, Student Interpreter at the British Consulate Bangkok.

(Communicated by the Post-Office.)

MR. J. THOMPSON, a photographic artist, having arrived in this country, towards the close of last year, for the purpose of visiting the interior of Cambodia and taking views of the ruins which exist there, I availed myself of the permission which His Majesty's consul was good enough to extend to me, and accompanied that gentleman on what, to him at any rate, has been a most satisfactory expedition.

We left Bangkok on the 27th of January last, travelling by boat in an easterly direction towards the inland town of Petchaburi, distant about 88 miles or upwards from Bangkok. Our course for the first two days took us, as a reference to the accompanying map will show, through the Klong San Septh, a long canal, cut to connect the Menam Chao Phya and Bang Phrakong rivers. It runs through a wide-stretching plain, the major part of which is totally uncultivated, but is of considerable importance as the high road by which much produce from Korat and Southern Laos, from the eastern provinces of Siam and the upper districts of Cambodia, is conveyed to this city. A want of proper care on the part of the Siamese to widen and deepen this channel and to keep it clear of weeds renders the journey along it tediously slow, and only boats of a small-carrying capacity, except in the rainy season, can make use of it.

A great number of Malays have for some time been settled along the banks of this canal. It is strange how they can permanently endure the attacks of the mosquitos there,—so terrible that the cattle and even the dogs pass the night in the water. No traveller, I believe, has ever spoken of this canal without some allusion to its mosquitos.

At nightfall, on the second day, we emerged from the above creek into the Bang Phrakong River. There was very little cultivation to be seen on either bank of this broad and deep stream. Some attempts were formerly made to peopple the barren plains through which it flows by planting captive Cambodians there; but, though these settlements still exist, their occupants have as yet progressed but little in the cultivation of the possessions assigned to them. The town of Petrin, however, set a little above the mouth of the river, is worthy of notice, much sugar being manufactured from canes cultivated



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by Chinese who are settled there. It is the residence also of a Roman Catholic priest, and contains a numerous community of native Christians.

The river higher up divides into two branches: that running northwards conduets to the town of Nakhonajok; while a second branch flows from an east-by-south direction through the districts of Krabin and Prachin.

Of Nakhonajok, I am told that it is a town of some extent, containing both Chinese settlers and natives of India. Sugar-canes are grown there, and the forests adjoining contain various kinds of woods, particularly that called Mai Tin sa-hin, so much prized by the Siamese for boat-building and other purposes. There is also a brisk trade in firewood, which is supplied thence to the sugar-mills at Petrin. A few silk arongs are the only articles of manufacture, and the place is mainly important as one of the three outlets for the silk, ivory, and other produce brought from Kerat and the northern districts of Laos.

Nakhonajok is reckoned to be one day's journey from Saraburi, one from Prachin, four from Kerat, and three from Bangkok.

Following the eastern branch of the Bang Präkong, we arrived, on the evening of January 29th, at the settlement of Prachin. This town is the capital of a province, or, as the Siamese term it, a Muang Laang: that is to say, that while itself under the immediate jurisdiction of Bangkok, it in turn owns authority over various smaller towns, each the head of an extensive district. In the present instance, Chantakham, Krabin, Watsana, and Arau are towns superintended by the Governor of Prachin. A great deal of rice is grown at this place, and some rosewood and timber of other kinds is cut: but the trade on the whole is inconsiderable. The neighbouring forests afford a shelter to numerous bands of robbers.

The authorities at Prachin, on seeing our passports, advised us to continue up-stream to Krabin, distant two days' journey by water and one by land, accordingly, we did so. The river became very tortuous, but the tedium of the journey was relieved by the extremely beautiful scenery which the lofty and richly-wooded banks presented.

We were now upwards of 100 miles from Bangkok, and the aspect of the country—no longer extending in swamps and dreary flats, with low mangrove jungles or a dark belt of coco-palms to bound the view—here, as throughout the rest of our journey, has a dusty white soil of fine sand. The cultivated districts, except in the rainy season, are dry, clear, and healthy, though the want of water is often severely felt. Coco-nut

trees being scarce, the want of oil is supplied by the general use of torches.

On the north these districts are bounded by a range of forest-clad hills, crossed by rivers which conduct to Korat; while towards the south a vast plain stretches, with a scarcely perceptible slope, to the borders of the great Cambodian Lake. This plain is, for the most part, overgrown with forests, but the dryness of the soil stunts the growth of its trees; and many a flat, which the rains convert into a swamp, is so parched by the heats when the floods have subsided that nothing but jungle-grass will spring up there. Groups of low hills, thrown up apparently by igneous action, break here and there the continuity of this extensive plain.

We reached Krabin late in the evening, January 31st. This town is of some importance; many Chinamen and other traders resort to it for the purchase of produce, which is not only grown in the locality but brought here for sale from Korat, from Northern Laos, and from the upper provinces of Cambodia. The residence of the governor of the town proper is planted on an elevation some three miles distant from the river, which at this point breaks up into two inconsiderable streams and is no longer navigable. The market, however, and all the business of the place is conducted at the waterside, where I found a large number of cargo-boats, whose occupants, having disposed of the manufactures which they bring for sale, and having purchased such produce as they require, return to Bangkok as soon as the waters have risen high enough to allow them to start.

Krabin is a province of the Laos race, a people distinguished from the Siamese both in their dispositions and customs. Being far removed from the influences of civilization, their wants are few and their habits simple. Rice, fish, and fruits are the food they subsist on, and water forms their principal beverage. They spin for themselves the clothes which they wear, and they supply the lack of earthenware and iron vessels by the dexterity with which they construct utensils in wickerwork. It is only the leading men whom frequent intercourse with Bangkok has taught to covet greater luxuries. It must be added that these people are excessively idle, as might be expected in a country where the mere necessities of life are so readily procured, while the task of clearing the land for extensive cultivation is exceedingly laborious, and offers but little remuneration.

Needles, thread, and other indispensable articles of foreign manufacture are introduced by the Chinese, who are planted in great numbers all over the country. Ponies are plentiful, but not commonly employed, buffaloes and oxen being the universal

beasts of burden. The soil being sandy, roads, except in the mountain and forest districts, are easily constructed. Goods are conveyed in carts drawn by buffaloes; but to Komit and some other distant towns access is so difficult, that all merchandise is transported in panniers on the backs of oxen. Long trains of these slow-footed beasts meet the traveller in the Korat forests. They appear but ill adapted for this use, being easily fatigued, and unable to endure thirst in districts where water is often extremely scarce; yet the people of the country have neither the energy to clear the difficulties which obstruct their mountain routes, nor the wit to substitute mules, or asses, for their own more clumsy beasts of burden.

Gold-mines were some few years back discovered in the immediate vicinity of Krabin. They are the exclusive property of the Chao Phya Umerat of Bangkok, who every year dispatches an officer to superintend the works, and collect the duty from those who resort there. The gold is obtained by washing. After the discovery of these mines one or two parties of Europeans proceeded thither from Bangkok; but the business is so trying, and the locality so fatal, that few of the adventurers lived to return, and the practice has consequently been discontinued. At present, owing to the death of his Excellency the late Umerat, the mines are closed. It is only in the dry season that they can be worked, and a duty of a fuang, for every fuang's weight of gold extracted, is collected from the miners—among whom Chinese, Siamese, Cambodians, and natives from all the neighbouring races, are to be found.

A cattle disease, which prevailed extensively throughout Laos and Cambodia during the previous year, not only carried off oxen, buffaloes, and ponies, but committed even worse ravages amongst the elephants.

At the small inland towns four or five only of these beasts are usually to be found; and, having been all in the present instance destroyed, we were compelled, not at Krabin only, but till our route brought us to the rivers of Cambodia, to travel with carts drawn by buffaloes, thankful if at occasional stages we were so fortunate as to procure ponies for our own riding. Buffalo-carts travel much more slowly than elephants; the cattle, on their part, require frequent rest; and the vehicles, being made only of wood and wickerwork, with not a nail or other piece of metal about them, are constantly breaking down and causing vexatious stoppages.

From Krabin a broad, level, sandy road extends right to Nakhon Si Thammarat, the modern capital of the province in which the ruins are situated; this road, the natives say, was constructed many years back by a celebrated Cochin Chinese

General; it passes at first through a wide forest of stunted trees, known as the *Phá hok Sai*, and subsequently through barren flats. It was, however, our object—as the heats were every day becoming greater, as we had no elephants to help us on our journey, and as water and places of shelter were alike difficult to meet with—to push on with all speed till we should reach some spot on the streams flowing down to Cambodia where we could once more journey by water.

Tigers are said to abound along this route. I, however, saw none; though the jungle, for many yards on either side, is carefully cleared that travellers may see round about them and avoid a surprise.

There was little traffic to be seen; occasionally, only, we overtook a caravan of Chinese, conveying manufactures to the interior for sale.

In the afternoon of February 8th, we reached the settlement of Watsana, the chief town of the province of that name. We made a temporary halt at this place, having to send back the carts which conveyed us from Krabin, and to secure fresh ones. It is the custom of the Siamese to insert instructions in a traveller's passport, directing the authorities at the various places he may visit to assist in purchasing such provisions as he may require, and to hunt up and arrange for the hire of conveyances. No Governor is, however, bound to do more than see the travellers safely to the next town; the vehicles and guides are consequently subjected to continual changes, whence frequent delays arise; but some such plan is unavoidable in a country where, without the co-operation of the authorities, no foreigner could procure vehicles or even persuade people to sell to him the necessaries of life.

This province contains about 2000 inhabitants, of whom 70 or upwards are Buddhist priests. The prison is empty, either because crime is infrequent among so simple a people, or because the neighbouring forests afford a secure place of refuge to offenders.

Rice is almost the only produce cultivated.

Leaving Watsana on February 10th, we halted at Aran on the morning of the 11th. This town occupies the centre of a wide stretch of paddy-fields, and is the head of a province containing about 1000 inhabitants.

Having passed the watershed, we now found a small stream running to the south-east; but the waters are, at this season, so shallow as admit even the canoes of the natives.

We left this settlement on the 12th of February, and soon after, emerging from the forest, pursued our journey for three days continuously through a dry sandy plain, overgrown with a

thin crop of parched jungle-grass, and, at rare intervals, diversified by a clump of stunted trees. The heats along this barren tract were excessive; while the stagnant pools of water, polluted by every passing drove of cattle, were unfit even to bathe in. Swarms of flies gave us unceasing annoyance. I was informed that in the rainy season this prairie is entirely submerged, so that light boats can travel over its surface.

On the 15th of February we reached Sisophon, a town planted on the high banks of a practicable river. This place is the capital of a Cambodian province, containing upwards of 1500 inhabitants, of whom about 60 are priests. It is three days distant from Korat, and is under the immediate jurisdiction of Bangkok. The famine which last year prevailed in Korat, driving the inhabitants to the border towns in search of subsistence, made its presence severely felt in this locality also. Even now, when the scarcity had long subsided, fowls, the commonest of live stock, were not to be procured; as all the poultry had been eaten up during the season of scarcity. In the immediate vicinity of this town rises a clump of three low hills, thrown up, it may be, by igneous action, and covered with an incredible number of curious fossils, shells, fishes, and coral.

Little can be said respecting the trade of this town, whose inhabitants desire nothing more than to raise rice, cotton, tobacco, silk, and such like produce, in quantities sufficient for their own consumption. Its river, like all other streams in Cambodia, swarms with an incredible multitude of fish; the villagers net them day by day, and swarms of aquatic birds unceasingly pursue them, but their numbers never diminish.

On the 17th of February, after a three hours' journey, we reached the town of Nakhonburi, the head of a small province of about 800 inhabitants, and under the authority of the Governor of Phra-tha-long. Here, having procured two small boats, we once more took to the water, and, on the evening of February 18th, started down a shallow stream, running in a south-easterly direction, between high and darkly-wooded banks. For the next three days our journey was very monotonous; the river, little frequented by foreigners, but to the natives known as the Klong Hua Kwai, makes its way apparently through wide and desolate forests; and the only inhabited places we came upon were the stations temporarily established by families of Cambodian fishermen. I must be permitted, however, to observe that to a naturalist this stream must present a field of singular interest, from the number, size, and variety of aquatic birds which throng the stillness of its lonely banks.

On the morning of the 21st of February we came upon the scanty and shattered relics of an ancient Buddhist temple;

these were similar in style to the ruins which we visited subsequently in other parts of Cambodia; but the thickness of the surrounding forest rendered it impossible to form an idea respecting their original size.

Leaving this place, we emerged about mid-day into the broad river formed by the junction of this stream with that flowing from Phra-tha-bong, and at 7 P.M. on the same day halted at Dan Sema, one of the frontier custom-houses of the Phra-tha-bong Province, where duties are collected from all the trading vessels that frequent the waters.

The city of Phra-tha-bong is a day's journey from this point. We did not visit it ourselves, but I ascertained that it is a town of much importance, having many rich products, and a comparatively extended trade. A Roman Catholic priest, and at least one French trader, are already settled there, and the Governor is said by the French to be a man of considerable ability. Phra-tha-bong pays an annual tribute to Bangkok of 70 piculs of cardamums, which may be reckoned in money value to be about 11,200 ticals.

It has been said by a late writer that this town was founded at a very recent epoch, and by the orders of the King of Siam. This statement, so far as I know, is correct; but there are nevertheless ruins in the vicinity of the town of an era corresponding to those in other districts of Cambodia. From Dan Sema we were forwarded without delay in a commodious twelve-oared Cochinchinese boat. The river, broad and stately as the Mé-nam Chao Phya below Bangkok, is enlivened by no inconsiderable traffic; its waters, now swelled by a confluent, now broken by a picturesque island, discharge about fifty miles below Dan Sema, into the head of the great lake. By 7 P.M. on the evening of the 22nd we could hear the winds roaring over this vast sheet of water, and in the calm of the succeeding morning we travelled about thirty miles over it in a nearly easterly direction till we entered a small creek which conducted to Nakhon Siemrap, the modern capital of the province in which the celebrated ruins are situated. We reached this place on elephants on the following day, and thus brought our travels for the present to a close.

Nakhon Siemrap is one of the two Cambodian provinces which still form dependencies of Siam.* It was in former times the centre of the Cambodian empire, and must have contained a dense population; but at present the inhabitants scarcely exceed

* There are one or two smaller districts, *viz.*, Siaphon, Nakhonburi, &c., which are called Cambodian, but they are on the confines of Laos, and partake quite as much of the one race as of the other.

ten thousand, a number singularly disproportionate to the size of the province. It embraces an area of more than 900 square miles. I myself travelled upwards of 30 miles across it without reaching the frontier, and in the vicinity of its capital is under an advanced state of cultivation. The major portion, however, of its territory is now covered with forests, broken only by the clearings round a few scattered villages, whose inhabitants grow rice enough for their own consumption, and produce palm sugar in supplies sufficient for a considerable exportation. On the north this province is bounded by the Laos district of Suren; on the west its frontiers stretch to those of Penang and Phra-tha-hong; it is continuous on the south with the kingdom of Cambodia; while the mountain ranges, which run in its eastern borders, extend in no strictly defined limits to the banks of the Mekong, and the upper districts of Cochin-China. Nakhon Siemrap pays an annual tribute to Bangkok of ten piculs of beeswax and fifty of Eastard cardamoms; estimating the former at 50 ticals a picul, and the latter at 20, the value of the whole will be found to be 1500 ticals. This produce is yearly delivered in Bangkok to His Excellency the Phu Sara Phi, who presents half of it to the King. The capital itself consists of a walled town, half a mile square, placed on the banks of a small stream about 15 miles above the shores of the lake. The Governor, of course, resides within the walls; but by far the greater portion of the inhabitants have settled about the banks of the stream outside, finding it more convenient to be in proximity to the water. The Chinamen, who are found in some numbers amongst the population, have established a small market in the principal part of the town.

There being an abundant supply of Mai Takienne and of other timbers suitable for boat-building, many of the inhabitants are engaged in that employment. The vessels built carry from 50 to 100 piculs, and their prices range from 150 to 170 ticals; they are in general esteem throughout the country, and are bought up both by the fishermen and by numbers of those who traffic about the Cambodian waters. In Bangkok, a boat of the same description would be worth about 500 ticals. It is to be regretted that the want of good water-communication offers a serious bar to those who might wish to engage extensively in cutting the timber of the forests. Many excellent varieties of wood are to be found there, and two, bearing the native names of Mai Chun-elat and Mai Katuo, are especially deserving of mention. These were the woods employed to construct the ceilings and other portions of woodwork required in the interior of the temple of Nakhon Wat. Fragments of the richly-carved beams are here and there remaining, and by their soundness

testify to the durability of a wood, which, for 1600 years, it may be, has thus resisted decay.

The province generally seems to be well adapted for raising rice, tobacco, cotton, and silk. Coco-nut palms thrive in the soil, and the castor-oil plant grows wild about the country. The neat homesteads, in the vicinity of the capital, are surrounded each by its stock of sugar and areca palms, mingled with coco-nut trees and rows of plantains; while the goodly supply of buffaloes and oxen, stabled close at hand, give further testimony to the superior affluence even of the peasant classes. When we consider how large a profit they bring back from the fisheries on returning at the end of each season to the cultivation of their rice-fields, I think the opulence of this people is satisfactorily accounted for.

I surmised at first, from the thriving aspect of the province, that its Governor possessed more discretion and less rancour than is common amongst Siamese rulers. Subsequent enquiries, however, convinced me to the contrary, showing that the Governor, while as grasping as the rest of his class, was singularly unfitted for conducting the administration of a frontier province under the eyes of a neighbour so adventurous and aspiring. He is personally civil and obliging, but his faculties are impaired to advancing years; and he is much disturbed at seeing that each year brings foreigners in increasing numbers to visit the ruins of the province.

There are fifteen criminals in the prison, the major part of whom are under a life sentence for theft; but there were also three murderers just captured for a deed perpetrated four years ago, and waiting till the customary reference should have been made to the King, in whom alone is vested the authority to determine their execution. Debtors are made over to their creditors to work out their debt: they are seldom put in irons, unless they have attempted to run away, and are generally treated with lenience.

Numerous temples of modern construction surround the city of Siemrap; but they lack the solidity which marks the earlier structures, and are already in an advanced stage of decay. There can be little doubt that this place was formerly one of the great centres of the Buddhist worship, and the number of priests to whom, even at the present day, it affords a maintenance, is strangely disproportionate to the extent of the population.

On the 26th of February we quitted Siemrap, and, after a ride of $4\frac{1}{2}$ miles through a sandy jungle-track, emerged suddenly from the forest upon the front of the temple of Nakhon Wai, the most famous and best preserved of the Cambodian ruins. I abstain from introducing here any lengthy description of the

remains we visited; the particulars of which are already known, as I believe, to archaeologists; but I trust, on a future occasion, to append a short chapter to the present report, containing such details of what the great Cambodian empire has bequeathed to its descendants as may seem to me to have not yet been brought fully under the notice of those interested in the matter.

Our quarters during the chief part of our stay in the locality were in one of the numerous salaks, erected from time to time by merit-working visitors in the spacious enclosure which surrounds the great temple before mentioned, which the care of the architect who designed the whole has furnished with more than one reservoir of excellent water. About thirty or forty priests have fixed their habitations under the shelter of the ruins, and find a never-failing employment in conducting the obsequies of those whose bodies are brought to this highly-revered sanctuary for cremation; and when to the music and feasting, which forms part of such ceremonies, we add the constant influx of visitors who come to make offerings at the shrine, it will be seen that it was not in forest loneliness, but rather amid a busy scene of life, that we were established.

On the second day of our stay at this place we were visited by two French traders, who had come into these districts with the view of embarking in the fish-trade. They complained greatly of the present state of trade in Saigon, where, they said, the Chinamen were engrossing all the business: they added also that any one wishing to occupy a piece of ground in that city was compelled to deposit a heavy sum of money in advance, which they said was a great discouragement to small capitalists. These observations respecting the commerce of Saigon were confirmed to me on several subsequent occasions. While merchants from Europe reap but slender profits, Chinamen are able, in three or four years, to amass ample fortunes, indeed I was told, on excellent authority, that the residences of Chinese traders at Saigon already exceed in their magnificence any that are to be found at Singapore.

On the 11th of March, and while we were still quartered on the premises of Naklon Wat, Captain de Lagree, Commander-in-Chief of the French forces in Cambodia, arrived on a visit to the ruins. He brought three French sailors and a draughtsman among his train, and took up his residence on the same ground as ourselves. I ascertained afterwards that this was the second time that Captain de Lagree had been in the neighbourhood.

During his present stay here he paid frequent visits to the ruins in the old city, but was chiefly employed in drawing up an accurate plan of the great temple and in taking plaster-casts of certain portions of the bas-reliefs. I discovered from con-

versation that he was intimately acquainted with the topography of the country, and with the ruins that are scattered everywhere over the districts which composed the ancient kingdom of Cambodia.

He was careful to explain to me that the original limits of that empire extended to the northern frontiers of Kora; and I found that he was furnished with large and accurate maps of Cambodia and Cochin China, recently compiled from surveys of these countries made by officers of the French Government. These maps have been published in Paris, and I suggest a memorandum to this paper containing information as to where they may be procured.

Captain de Lagree quitted these districts about the same time as ourselves, and taking the overland route down the eastern shore of the Great Lake to the city of Kampon Sava, he passed thence to where his gunboat was awaiting him in the river which runs from the outlet of the lake to Penang.

On the 10th of March, and while ourselves and Captain de Lagree were still staying at Nakhon Wat, there arrived a Siamese nobleman, despatched by the King, as he informed me, on a special commission to explore the ruins and take drawings of the bas-reliefs. He brought with him draughtsmen and other requisites for that purpose, and he delivered to us a message from His Majesty, enjoining Mr. Thompson to take elaborate and complete photographs of all that was interesting. These he gave out as the sole objects of his mission, but M. Lagree afterwards told me that he came charged with a secret political purpose, the nature of which I did not ascertain.

On the 11th of March we shifted our quarters and removed to the old city, which stands about a mile distant from the great temple, and encloses six square miles of ground within its lofty and solid walls.

This area is wholly overgrown with jungle and forest-trees, and is so thick with ruins of temples, palaces, and other buildings, that it would require at least two months to explore it satisfactorily. Deer and even tigers roam unmolested over the deserted city, whose only inhabitants are a few families of slaves, sent there by their masters to collect oil, rattans, berrans, and other produce of the forests. Here, as at Nakhon Wat, numerous and extensive reservoirs, lined with walls of solid masonry, secure an abundant and never-failing supply of water. But the neighbourhood is unhealthy, and on the third day we were forced to fly from the fevers which had broken out amongst our party.

The preparation of a boat wherein to continue our journey being likely to detain us some days at Siemrap, we employed our leisure in a three days' excursion to the neighbouring mountains,

whence the stone used in the buildings we had visited was reported to have been procured. We found that the high ground about the foot of this range was covered with enormous boulders of the stone, which crept up from the soil in every direction; but we were unable to penetrate the dense forests enveloping the hills themselves, and which are said to conceal, not only the chisel-marked quarries where the stone was cut, but also an immense image of Buddha, hewn from the solid rocks in the furthest recesses of the jungle.

On the 21st of March we were able to take a final leave of the neighbourhood of Sournap, starting at daybreak, in a ten-oared boat, and travelling down the lake in the direction of Udong.

This great lake, which forms the most striking geographical feature of Cambodia, is upwards of 100 miles in length; and though its breadth is small when compared with its length, yet it is only at its extremities that the eye can see across it. It is bounded sometimes by a broad belt of forest, sometimes by low swampy lands, and in the dry season is so extraordinarily shallow as to be scarcely breast deep, even three miles from the shore. In the rainy season, however, there is a very considerable rise; the lake then spreads its waters far into the forests which surround it, and becomes navigable for steamers of considerable size. The bottom consists of mud and sand, and the currents, which are reported to be strong in the time of flood, become insignificant when the waters have subsided. Frequent and strong winds blow with regular alternations, according to the season of the year, and render both the lake itself and the banks round about it cool and healthy, even during the greatest heats.

Numerous families of Cambodians, Cochinchinese, and Annamites settle every dry season along the shores of this lake, and employ themselves in taking and curing the fish with which its waters are mercifully thronged. During the first three months, two sorts only of these fish are taken; during the last, they pursue a monstrous black species, not uncommonly twenty feet long. The latter is very plentiful, and not only forms an article of food, but supplies the oil in general use among the common people of Cambodia. Two or three families, to the number of twenty souls in all, will commonly associate together for a season's fishing. The nets, which are large, and perhaps worth some seventy tiels (102 *frs* 54*c*), a set, they prepare anew by their joint efforts during the leisure of each rainy season.

The salt they purchase for about half a tiel a picul at Pemsapin; and they are provided with two or three fish-cargo-

boats, built for the purpose of Mai Takienné, and carrying from 70 to 100 piculs a piece. On the spot which they may each year select for their purpose, they build temporary residences with bamboo and ratans, at little outlay, either of labour or capital. In the course of three months, a party of fishermen will thus cure about 400 piculs of fish, entailing a consumption of 120 piculs of salt; and they will dispose of the whole at Penompein at the rate of about five tiens a picul. It will thus be seen that the business is far from unprofitable; indeed, several French traders are already engaged in it, and it is anticipated, as M. de Lagree has stated to the King of Cambodia that next year will see no inconsiderable number of his countrymen established about the shores of the great lake. Having concluded this enterprise, and disposed of their stock, the fishermen leave their settlements to be swallowed up at the rising of the waters, and re-urn to their homes in time for the cultivation of their rice-fields.

In many of the shallowest parts of the lake the water sinks so low that, during the last month of the dry season, a crop of paddy is grown in the rich muddy bottom, which a little later will be covered with several fathoms of water.

Early on the 21th of March we passed through the straits which terminate the larger lake, and emerged thence into a smaller one; having crossed this by about 3 P.M. on the same day, we entered the broad river which forms the outlet of these waters, and which, after running past Kampou Luon, and thence to Penompein, unites at this last place with the Mekong, the mightiest of the Cambodian rivers. The banks on either side of our course now became sandy and high, but the houses though planted on their summits, were still carefully raised on piles some distance above the ground, to escape inundation when the floods set in. The principal occupation of the inhabitants of the frequent villages which we passed was the preparation of indigo-dye, and the manufacture of fish-oil. Both were very conspicuous employments; as, in the one case the large pitchers of blue dye were set out to the sun in rows along the terraced banks, and in the other the furnaces for preparing the oil were scooped out of the soil along the edge of the river.

Tigers are so numerous throughout these districts, that even in the largest settlements the inhabitants are afraid to linger about the outskirts of their dwellings so soon as darkness has set in.

At sunset on March 24th we came to where M. de Lagree's gunboat was awaiting his arrival, and as that gentleman had politely so it notice of our approach, we were received with the greatest kindness on board. This vessel is a small mon-chui

screw-steamer, carrying a crew of 35 sailors, and a single heavy rifled cannon in the bows. The French Government have placed her permanently in these waters; but the medical officer resides at Kampon Luon, where M de Lagrev also has a house, and his Government a military dépôt. We reached this last place at daybreak on March 26th, and found it to be of some importance, and the seat of a considerable trade.

A market runs nearly the whole length of the town, which is formed of a double row of houses stretching upwards of a mile along the right bank of the river, and of a multitudinous fleet of boats, moored along the shore, and laden with produce from every corner of the country. A fine paved causeway is carried through the town, at right angles to the central part of which a broad smooth road conducts, with a gentle rise, to the city of Udong, lying on a slight eminence 1½ miles distant from the edge of the river. The trade is similar to that of Penompeu, particulars of which may be found in the table to my original report. Numbers of Malays have, for several centuries, been settled in this locality; and many other races are represented amongst its population. All the respectable inhabitants are clad in the bright coloured silk fabrics which are extensively manufactured here; and as they hurried to and fro, sometimes on ponies, occasionally on elephants, but more frequently in light carts drawn by fleet Cambodian cows, they presented a busy and brilliant scene of life, such as we had not hitherto encountered. If these people are judged in their persons than the Siamese, they certainly surpass them in municipal cleanliness. Their roads are bright, and in good order; their markets are everywhere free from the filth which pollutes the bazaars of Siam; the King's steamer and his palace are patterns of neatness; while their temples neither inside nor outside exhibit a trace of the slovenly neglect which defiles even the most sacred and sumptuous of the shrines about Bangkok.

A small French steamer plies once a month, between Kampon Luon and Saigon, starting from this last city on the arrival of the mail by the *Messageries* from Europe, and reaching her destination three days afterwards. The King of Cambodia, shortly after his accession, procured a coining-press from Europe and commenced to issue a silver currency, modelled after that prevailing among the Siamese. Finding, however, that his coin drifts steadily into the hands of the Chinese traders, by whom it is exported to China, he has thought fit to close the mint, and to allow the old Cochon-Chinese currency to come once more into circulation; this consists of three singular pieces of coin manufactured at Hué, by Thu-due, the Emperor of Cochon-China. The commonest is made of a brittle composition, whereof

the chief ingredient is antimony. Each coin is a little bigger than a farthing, and is bored with a hole in the centre, so as to allow numbers to be run together on a string; 2000 of these little coins make up the value of one Siamese tical (about 2s. 8d. sterling). They are universally in use among the people of Cambodia, who may be seen carrying them in cumbersome bundles from place to place. In Bangkok the same coins are employed as counters at the public gaming-tables. In a country where so much base coin is in circulation, and where the adulteration of money is commonly practised, it is yet hardly worth the while of any to tamper with pieces of such insignificant value, so that there is, at any rate, one advantage which they possess. Besides the above coin there is stamped bar-silver, each bar being worth 50 Siamese ticals; and lastly there is stamped bar-gold, each bar representing 187½ ticals of Siamese currency. This last coin is scarce, as may be supposed; but it is an exceedingly handsome piece of money.

We found at Kampon Luon that his Majesty the King of Cambodia was at present residing at Penompein; and that his uncle the Soudetch Chao Pa Then La-har was left in charge of the capital. We determined to visit this gentleman, and accordingly left for Udeng on ponies during the afternoon of March 26th. Half-an-hour's ride brought us to the gates of the city, which, having been built by the late king while Cambodia was the theatre of constant disturbances, has never attained anything but the most insignificant proportions. The walls consist simply of a double row of boarding, 10 feet high and inclosing in a space of about a square half-mile the palaces and premises attached thereto, the residence of his Majesty's uncle, and those of one or two other of the principal personages, together with a good-sized market and four reservoirs or sheets of water. The noble men, the courtiers, and all the rest of the inhabitants reside either at Kampon Luon or in hamlets scattered over the country outside. There is not even a temple within the walls of the city, which, during the absence of the Court, is almost entirely deserted; and whence the bazaar also has migrated with his Majesty to Penompein. Even the palace consists of a few thatched wooden residences, scrupulously clean, but widely unworthy to be the dwelling-place of a monarch. Finding so little of interest in this place, we returned in about an hour to Kampon Luon, where we were hospitably received by Dr. Henrart, the French surgeon attached to that station.

On the morning of March 27th we quitted Kampon Luon, and continued our course down the river to Penompein, which we reached at ten o'clock on the evening of the same day. This is the most important town in Cambodia. His Majesty the King

has lately taken up his residence there, and has employed a French architect to build him a large and substantial palace, which is now in process of construction near the bank of the river.

A reference to the accompanying map will show that this settlement commands the junction of four rivers; that which runs from the Great Lake, and which forms the high road for the traffic of Upper and Central Cambodia, here uniting its waters with the main branch of the Mekong; the confluents, dividing where they meet, thence send two branches southwards in the direction of Saigon, and the outlets in Lower Cochin-China. It will thus be seen that the King of Cambodia has been wise in selecting as his new capital a town whose site is of such great commercial importance; and which has, in fact, long been the seat of a thriving trade, conducted with all the surrounding countries. It enjoys also further advantages: planted in a dry and sandy soil, on the lofty banks of the adjacent rivers, it is fanned day and night by frequent breezes, now blowing from the seaboard, now from the cool surface of the neighbouring waters. I was there during the hottest season of the year, but found the climate more salubrious and refreshing than that of Bangkok, or the other inland settlements in Siam. A great change, however, must take place in the aspect of Penompein during the period of the inundations; the waters rising from 32 to 33 feet above their accustomed channel submerge the lofty banks, and flood such dwellings as are not elevated on piles beyond the reach of danger.

The presence of the Cambodian Court, which has lately fixed its residence at Penompein, is working a great and rapid transformation in the condition of the town. A broad and solid causeway, stretching through the principal quarter, will shortly supplant the original narrow thoroughfare; a handsome and substantial palace is in course of construction; and while the Mandarins are fast filling the eligible sites with private residences, the booths in the market are giving place to commodious brick dwellings which traders are erecting there.

The French Government has a small military and naval dépôt at Penompein, and a postal agent resides there. Catholic priests are established in three separate missions, under the superintendence of the Bishop, Monseigneur Miche, who has charge of the interests of his Church in Cambodia. There are also a few French *employés* in his Majesty's service, and one or two merchants; but the inviting prospects of the settlement have hardly as yet so grown into notice as to attract thither any great number of foreigners.

The native population must constantly fluctuate, but cur-

prises native Cambodians, Cochin-Chinese, Chinese, and Annamites, besides sundry emigrants from Siam and her tributaries. One of the chief elements of the population is derived from the Malays introduced into the country some centuries back, and whose descendants are found settled in great numbers at Udong, Kampot, and other parts of Cambodia.

These Malay tribes still speak a corrupt dialect of their parent language, and retain many of the habits and manners of their forefathers; they are subject to the King of Cambodia, but have chiefs of their own stock, to whom the general control of their affairs is entrusted. But while thus preserving many of the distinctive features of their race, they have lost the courage and energy, the skill in navigation, and the superiority of intelligence for which the tribes of Malaya are celebrated.

The Cochin-Chinese engage very actively in the fish-trade, and numbers of them are converts to the Roman Catholic religion; they are great gamblers, and own most of the tables which are set up nightly all over the bazaars: indeed, so far as I could judge, and considering the disparity in population, there is much more gambling carried on in Cambodia than there is at Bangkok.

The Court and Government of the Kingdom of Cambodia differ little from that established in Siam; both indeed, from what I ascertained by inquiry, or gathered from personal observations amongst the ruins, being modelled from that which formerly existed in the ancient Cambodian empire.

The Court of Udong is inferior both in numbers and sumptuousness to that of Bangkok. The Serabodi consists of four members, as contrasted with the six which compose the Siamese Council; but there, as in Bangkok, two officers of the highest rank divide the duties of the administration: and the principal gathering of the Court is held with closed doors at midnight in the interior of the Palace. There is at present no reigning king, and I took occasion to ask his Majesty whether it had, at any time, been the practice in Cambodia to divide the honours of royalty. He replied that such had frequently been done; and that, if his brother at Siam were to come into the country, and there were a general wish for his elevation to the throne, it would be his duty to sanction the measure.

I was told by a Frenchman in his Majesty's service that the King's income may be reckoned at about 1000*l.* a month; but though M. Le Foucheur had ample opportunities for forming an estimate on the subject, I yet conjecture that he may have been anxious, so far as possible, to give me an unfavourable impression respecting the general affluence of the country. His Majesty, too, has many private sources of wealth, which it would

be impossible to ascertain precisely; but it must, after all, be admitted that neither the King nor his courtiers can at all rival the opulence of the authorities at Bangkok. But, if they yield to their neighbours in the extent of their revenues, they at any rate eclipse them in the politeness of their manners.

The French have already taught them to treat foreigners with a deference and respect, which is often found wanting in Siamese officials; they have imbued them with a taste for European habits and refinements; and, by raising a desire for the luxuries enjoyed in civilised countries, they have inspired them with a conspicuous anxiety to increase their revenues by the development of the produce and commerce of their country.

The treatment which I received during my visit to Penompein, at the hands of the King himself, and of the mandarins about his court, left nothing to be desired; and, though prompted so to act countess by a natural anxiety to cultivate the friendship of the English, yet the manner in which they carried out their intentions showed how rapidly French tuition is advancing them in civilisation.

On placing my letters of introduction in the hands of the proper authorities, I had not long to wait before the King's interpreter summoned me to his Majesty's presence. The conversations which I had during the various interviews with which I was honoured are detailed below.

His Majesty is a young man of about thirty years of age, and of exceedingly amiable manners. He is the eldest of the four sons of the late King of Cambodia, and was long detained with his three brothers in a sort of honourable captivity at Bangkok. On the demise of his predecessor, four years ago, he was placed on the throne by the present King of Siam, who retained the younger princes in Bangkok, as a guarantee for the fidelity of their more fortunate relative. The second son was carried off in a French gunboat to Siam when Cambodia was ceded by the Siamese, in the spring of last year. He still resides under French surveillance at that city, greatly to his Majesty's annoyance and apprehension. The two younger princes remain at Bangkok.

His Majesty converses fluently in Siamese, and very courteously offered us every facility, both for expediting our journey and for enabling us to visit whatever was of interest in the neighbourhood. He placed a house at our disposal, and invited us to dinner at his palace that evening.

We made an eight days' stay at Penompein, and were not only the frequent guests of his Majesty, but were received by the French also with the utmost civility.

His Majesty maintained a small body-guard about his person.

and he invited me to see them exercise on the morning of our departure. He has no European drill-master at present; but he told me that he was anxious to engage an Englishman for that purpose. The troops are composed of twelve companies, which serve in monthly rotation.

His Majesty stated, in course of the inspection, that he would have ordered them to assume the sumptuous uniforms reserved for State occasions, had the day been a festival; but he feared that the French officials might conceive that an emissary of the Consulate at Bangkok was receiving military honours. I gathered from this and from many other circumstances that the King's authority is completely under the control of the French, who besides establishing their officials in the country, and sending a gunboat to cruise upon the rivers, have introduced several of their *employés* into the royal service, themselves disbursing the major portion of their salaries.

His Majesty possesses a small iron screw-steamer of English manufacture, and purchased in Hongkong. The French engineer, in charge of that vessel, receives 40 dollars a month from the Imperial Government. M. Le Fenehear, the architect of the new Palace, is paid also, as I believe, by the French, but nominally for services as an explorer of the country. His Majesty has besides two interpreters in his employ; the first one a Spaniard, and the second a Portuguese half-caste.

I failed to discover any British subjects resident at Penompein; but it is certain, that numbers of Mussulmen traders repair there at intervals, bringing precious stones, Bombay silk, gold-lace, embroidered muslins, and other valuable merchandise. These wares find as ready a sale at the Court of Cambodia as they do at Bangkok; indeed, it may be worth while mentioning that, in both countries, it is from the Mussulmen traders chiefly that they obtain the rich materials composing the Court-dresses, and the sumptuous costumes of their theatrical establishments.

The King informed me, when I visited his lakkon, that many of the crowns worn by the *danceuses* were of solid gold, and taken with the jewels that studded them were worth as much as 100*fr.* apiece. These crowns, however, are made either in France or China, according to the patterns supplied by the Cambodians.

Few English manufactures have as yet found their way into the country, the requirements of the King and his nobility being supplied almost entirely from France. In the shops, however, not only at Penompein, but also in the remotest corners of the kingdom, English needles and sewing thread, and German lucifer matches are to be met with. Small looking-glasses are, next to these, in demand; but it is not easy to fix the country from whence they were imported. The willow-pattern plate and other

cheap specimens of English earthenware are found mingled with crockery and glasses from China, which country supplies also the brass and iron ware required for domestic uses, and the tools employed by carpenters and in the cultivation of the ground.

Chinese coolies may be hired in Penompein for about 20 cents a day; the wages thus fall short of those paid in Bangkok, where 30 cents per diem is the average rate. This deficiency is, however, fully compensated by the much cheaper prices of fish, rice, vegetables, and the other ordinary necessaries of life.

Formerly many junks visited both this place and Saigon, bringing coolies and other emigrants in large numbers from China; of late years they have ceased to arrive. There is, however, still a large importation of teas and silken fabrics, which, they assert, are both cheaper and superior in quality to any that may be purchased in Bangkok.

Among the domesticated animals of Cambodia is found a breed of cows of peculiar excellence; they bear a much higher price than the ordinary cattle of the country, and are run in light carriages by the nobility, who prize them for their strength and fleetness. Nowhere in Siam, Laos, or Cambodia are the people acquainted with the use of milk. Cattle are abundant and cheap, but are employed solely as beasts of burden; while goats in that respect useless, are to be found only at Bangkok among the foreign community.

Mons. de Lagree, who has paid some attention to the subject, expressed an opinion that Cambodia had derived its chief wealth from its mineral resources. The relics of that empire testify at once to the denseness of the population, and to the opulence of their rulers. It is scarcely probable that, in those early days, extended maritime relations contributed much to the riches of the kingdom, and it is perhaps on these considerations that Mons. de Lagree bases his theory; I am not prepared to endorse these views, yet I think that gold, silver, antimony, and other precious metals are concealed beneath the forested mountain-ranges. At the present day, however, iron forms the only mineral produce of the country. The mines are in the mountain districts of Kampon Sawai, and are the exclusive property of the king; the metal produced there is of the finest quality, but is much reduced in value by improper smelting. It is sold in rough fragments in the markets at the rate of 15 to 20 ticals a picul.

It happened on one occasion, while I was residing at Penompein, that a conflagration swept off a great portion of the Malay settlement there. I was told that such occurrences were common, and that they might often be traced to the work of some incendiary, who, having arrived in the market with a large sup-

ply of bamboos, adopted the above expedient for bringing them into demand.

I had the good fortune, during my stay in Penompein, to fall in with a Buddhist priest of high rank, who has lately been studying the inscriptions found amongst the ruins scattered over Cambodia. Having heard that I had procured copies of some of these, he called, and requested to see the same; and it is to his kindness that I am indebted for the interpretations before alluded to. This gentleman was twenty years resident at Bangkok, and was a companion of the King of Siam, when his Majesty was a member of the priesthood. By special request of the sovereign of Cambodia he has taken up his residence in that kingdom; and, while deeply read in the languages and archæology of the East, he possesses a gentleness and refinement in his manner which is one of the marked characteristics of those indoctrinated with the tenets of the Buddhist religion.

Having decided to proceed to Kampot, and from thence by sea to Bangkok, we took leave of his Majesty at mid-day on the 4th of April, and set out with elephants and buffalo-carts to accomplish our journey. There has long been a fine road from Udong to Kampot; but it is not till recently that a route has been opened by way of Penompein; the distance is about 120 miles, which it requires about five days to accomplish, and the road, which was still under construction, forms a junction with that which leads to Udong, about 15 miles above its termination. It is broad and level, passing for the most part across a sandy plain, where jungle-grass, shrubs, and stunted forest-trees abound. No important towns are met with along this route, but the villages are frequent and of considerable extent. The inhabitants are chiefly employed in the cultivation of rice and the manufacture of palm-sugar.

We had now reached the hottest period of the dry season and had not only to travel beneath a scorching sun, but to encounter some difficulties from the scarcity of water, as the rivulets had all run dry, and only a few stagnant pools were occasionally to be met with; these sufficed, indeed, for the wants of our servants and cattle, but we had ourselves to drink sugar-palm juice and the milk of coco-nuts. We fell in daily with parties of traders conveying produce, in bullock-carts, between Kampot and Penompein, or by numerous cross-roads from the settlements in the interior; so that there is every sign that this important highway will prove of material advantage to the commerce of the country.

On the 8th of April we encountered a token of the troubles which for a long time distracted the country; a human skull,

impaled where two roads meet, marks the spot where, three years back, a band of rebels were overthrown.

A fugitive slave, named Issawa, having gathered to himself a party in Southern Cambodia, set up a claim to the throne. He had sufficient influence to secure the countenance of the Cochin Chinese, but was ultimately defeated and driven from the country. He still enjoys an opulent and influential position in his place of refuge in Cochin China, and is by many deemed the real heir of the Cambodian monarch, whom in person he closely resembles. The advanced guard of his troops being routed in this locality left two of their leaders in the hands of the enemy; their heads were at once struck off by their captors, and set up to whiten upon the field of battle.

We were by this time nearing the lofty clumps of mountains which rise in the vicinity of Kampot. These hills, mantled in impenetrable forests, save where stony precipices forbid all vegetation, are the haunt of elephants, rhinoceros, and many other wild animals.

Deiling through the passes on the evening of the 8th, we halted at the borders of a fertile plain, about 20 miles distant from the coast; thence a short march next morning conducted us to Kampot, and ended the heat and thirst of a really toilsome journey.

The town of Kampot stands in a fertile plain, under the shelter of a lofty range of mountains, and on the borders of a river ten miles distant from the sea. This stream, rising in the hills a few miles above the town resembles an arm of the sea rather than an inland river; the tides extend their influence to its sources, and fill the broad and deep channel with clear green sea-water.

Rice and palm-sugar are raised in the surrounding plains, but it is to the pepper plantations along the banks of the river that the place owes its principal importance. These latter are wholly in the hands of the Chinese, who cultivate them with their usual industry. I am told that the vines surpass those of Singapore, but that, by cutting the berries before they reach maturity, they considerably impair the quality of the pepper. Coconuts, betel-vines, areca-palms, and pine-apples, are grown abundantly also throughout the plantations.

During the disturbances which preceded the French invasion of Cochin China, and while the new comers were still regarded with dread, traders flocked in numbers with their produce to Kampot, the commerce there was thus forced into briskness, and European vessels often loaded at the port. But latterly these influences have ceased to operate, and Saigon has been found by many to be a more convenient market. It is not,

however, to these circumstances alone that the decay of the settlement is due, many local considerations have contributed to impair it. The seaboard swarms with pirates, and the rulers, for their own profit, secretly countenance their depredations.

The Christians look only to the authority of their priests; the Malays have chiefs of their own blood to rule them; the Chinese monopolise the market, and are too numerous and turbulent to obey any one whatever. Hence the legitimate governor, whose very title is dubious because conferred at Bangkok, is in a great measure destitute of influence, and the town consequently suffers from the divided state of its government. The whole of the commerce of the place is engrossed by the Chinese, and their extensive godowns, filled with pepper, rice and other varieties of produce, testify to the wealth which they derive from the monopoly. But even this close body is divided within itself; and the Hainan Chinamen, by steady persecution and frequent riots, are driving the Fookheans out of the settlement. If the former party be permitted to consummate their endeavours, I think little will be wanting to complete the ruin of the port. It is worth, however, of remark that here, as in many other Eastern markets, a Swatow Chinaman is the foremost amongst the merchants.

On the coast, 30 miles below, is the rising settlement of Kankhao. This formerly belonged to the Cambodian territory, but was seized, 40 years back, by invaders from Cochin China. Its exports are pepper, sugar, and rice, but above all the matting and gunny bags which are made extensively in the interior. The proximity of a foreign port is a further source of injury to the commerce of its neighbour.

His Majesty the King of Cambodia proposes to pay a short visit annually to this part of his dominions; and, so soon as he shall have completed his palace at Penompein, a similar residence will be erected in the vicinity of Kampot. We may hope that the occasional presence of the court will not only lend a stimulus to the traffic of the settlement but remove in some degree the difficulties which keep it down. On being ceded by Siam to its present ruler, His Majesty appointed his brother-in-law to superintend its administration. This nobleman, however, resides permanently about the court, and but therefore is gained by the arrangement. It was formerly the custom to send tribute to Bangkok at this season of the year, but Cambodia being now freed from her allegiance to Siam, the right can no longer be enforced. The boats, however, were loaded and ready for sea when I was at Kampot, and they had been six weeks awaiting the final instructions of the King, who was apparently undecided whether to send them or no.

I cannot say for certain whether any British subjects are to be found among the Chinamen of this place; but I think that such is probable, as many of them have been educated at Hongkong or Singapore. Several, at any rate, are agents for English houses, and receive frequent consignments of their cargo.

On their complaining to me bitterly of the depredations of the pirates, I advised such of them as were concerned with British property to represent the case, in writing, to the consul at Bangkok, who would assist them in the matter. Owing to the general dread of these piratical cruisers, cardamums, silk, and other valuable produce, are no longer brought down here for exportation.

So considerable is the bar at the mouth of the river, and so shifting and uncertain are the channels across it, that ships are obliged to anchor in the roads outside, and to have their cargo conveyed to them in lighters. Even these craft, at low water, are unable to come out.

Having procured a small cargo boat, and six sailors to man it, we quitted Kamput on the 12th of April. Favouring winds brought us rapidly to Bangkok, where we landed in health and safety on the evening of the 17th.

I propose to offer a few remarks on some miscellaneous subjects which could not conveniently be introduced elsewhere.

The King of Cambodia told me that the population in his dominions might be reckoned at a low estimate to comprise 600,000 Cambodians, 10,000 Cochin Chinese, and a multitude of Chinese settlers. He could furnish, he said, no precise information of the extent of his territory, nor of the number of days in which an elephant could cross it. I ascertained, however, subsequently, that it is made up of fifty-five towns; and a list of the most important of these, with the titles of their rulers, will be found in the Appendix.

Silk forms perhaps the most important branch of commerce: a fine quality of the raw material is already exported in considerable quantities, and the country, being eminently adapted for the rearing of silk-worms, the trade is capable alike of improvement and extension.

Cambodia, however, enjoys a still greater reputation for the beauty and excellence of the lungoutis and other silken fabrics which are largely manufactured in the vicinity of the capital. In the richness of their dyes, and in the elegance of their designs, they evince a striking superiority to the neighbouring nations, among whom the silk cloths of Cambodia are in considerable demand.

The proprietors of machinery in these countries are obliged as is well known, to send from time to time to Europe for the leathern belts which they may require. Such well-dressed ludes, however, are to be found in Cambodia that I know of no instance, at any rate, in which they have been applied to that purpose. The presence in Penompein of an extensive collection of timber, to be employed in the erection of the palace, afforded me an excellent opportunity of inspecting the different sorts of wood which are to be found in the country; these are not only numerous, but embrace, as I believe, many valuable varieties. I observed several descriptions of rosewood, together with a species of pine, and one or two samples also were shown to me of woods highly serviceable for resisting the effects of water. The French traders are already realising handsome profits by the exportation of these woods to Saigon, where they meet with an advantageous market. His Majesty seems to consider that the timber trade will prove a great source of wealth to his country, and he assured me that he was most anxious to induce foreigners to embark in it. On my asking whether the authorities would be likely to grant protection and assistance to any English subjects who might come to work in the forests, he promised readily to supply to such persons the permit which they would require, and to render them any further facilities that might be proper.

On a subsequent occasion, I inquired of the King what conditions would be demanded of British subjects desiring to rent or purchase land in his dominions. His Majesty replied that he could allow no foreigner to buy land in absolute ownership; but that, having first obtained his sanction, they could lease either the crown land, or that of private individuals, for terms of 30 years or less, according to agreement. He said that the river frontage about Penompein was principally his own property, and that any foreigner might rent such a portion of it as he might require, at the rate of ten salungs (6s. 8d.) per annum for every square sen of ground (16,000 square feet). His Majesty dwelt with frequency and emphasis upon the troubles that were occasioned from time to time by the overbearing proceedings of the Roman Catholic priests. It may be remembered that the cruelties practised upon the French missionaries in Cambodia and Cochin China furnished France with a plea in the first instance, for interfering in those kingdoms. The outrages committed may be palliated to a certain degree by considering what the conduct of the priests has been ever since they set foot in the country.

Wherever a priest may have set up the Cross he makes haste to gather as many converts as possible under its shadow; he

exertions, carried on with the diligence and ability which characterise the emissaries of his Church, and seconded by the adaptability of his faith to the requirements of its worshippers, soon enable him to draw some hundreds of the population to his vicinity. Over these he in a wondrous manner gains supreme control, and claims them as subjects of the Imperial Government. Ever ambitious to extend the influence of his Church, and to magnify his personal authority, he fomenta petty disturbances, and is unceasingly at war with the rulers of the country. These, not unnaturally, view his aggressions with jealousy and are neither inclined to confer on an intruder the power which he lays claim to, nor to allow that their own people have changed their nationality in embracing a different religion. At the present day these priests, both in Cambodia and Siam (where similar conduct has led to similar results) are regarded with the greater odium as they presume upon the support of the much dreaded French officials in the cases with which they are continually harassing the authorities. We can scarcely feel surprised if, when first they introduced themselves into the country, the native rulers took such measures as they deemed would most effectually put a stop to their aggressions.

Following in the footsteps of the Siamese monarch, the King of Cambodia last year issued a decree prohibiting the exportation of rice. This injunction (which was withdrawn in Bangkok in the month of August) was still in force in Cambodia when I was at Penompein. Each, however, of the Frenchmen who are engaged in trade at that place had been indulged by his Majesty with leave to continue the exportation.

The effect of the prohibition was of course to cheapen rice in Cambodia, and to raise its price at Saigon; and we may therefore conjecture what a golden harvest was being reaped by the favoured few.

In the conversations which I held with many of the Cambodian officials, I could not fail to remark the complacency with which they dwelt upon the ancient grandeur of their empire, pointing out how it had included the provinces of Siemrap and Phra-tha-bong, and had extended its frontiers beyond the city of Korat.

I believe that the French Government are already aware of the value and importance of Cambodia, and that while they entertain no design of taking it absolutely into their own possession, yet that they think both to add to their riches and to strengthen their influence in the East, by erecting it into an important monarchy under their own superintendence. With these ends in view, they are busily engaged in exploring its remoter districts, searching out practicable routes, and investigating the

navigable rivers. M. Le Foucheur was employed to conduct an expedition to the tribes of the interior, and it was not till he had brought a strong party to the wealthy city of Wieng Xan that he was forced to desist in his undertaking. Armed with new and more imperative passports he is about to journey a second time to the same regions, while a scientific commission is to be organised by M. de Lagree, and despatched next cold season, if possible, to explore the sources of the Mekong, in the heart of Southern China. It cannot therefore be denied that they are doing good in the country.

I was able, in the year 1865, to pay a visit to the city of Kout. This capital consists of a large walled town, occupying the centre of a plateau which is girt by low ranges of mountains and by a magnificent belt of forest. It is the seat of an extensive trade, the great emporium for the silk and other products of Laos, and forms, next to Bangkok perhaps, the most important city within the Siamese dominions. It may be reached most rapidly by way of Nakhona Jek, but even on that route eight days must be expended. Carriage roads could be constructed thither with little expense or trouble, and while the delay in the communications would thus be considerably abridged, much encouragement would also be given to the trade, which is hampered at present by the difficult nature of the approaches. But the Siamese have as yet taken no measures to bind this important outlying province more closely to themselves.

The port of Nantakoen seems to offer a natural outlet for the produce of Itra-tha-bong; from three to four days are at present required for crossing the forest-clad mountains which divide the one of these settlements from the other; and the road is so difficult that most of the merchandise is conveyed down the lake to Udong, or transported across country to Krabin. I found during my stay in Siamraj that two French men had established themselves in that district for the purpose of entering into the fish trade, and that they were anxious to buy or rent a small allotment of land.

The governor took occasion to inform me of the matter, and to ask me for my opinion thereon. I told him that, as long as his province belonged to the dominions of the King of Siam, any proposition from French subjects respecting the acquisition of land should be made through the agency of the consul at Bangkok, and that as the parties in this instance had come from Udong, I presumed that such had not been the case. He told me that I was mistaken, that reference had already been made to Bangkok, and that he had been instructed by his Government to intrust the matter to M. de Lagree for adjustment, who that gentleman should pay his intended visit to the ruler.

On the demise of his late Majesty, the second king, orders were despatched at once to the remotest provinces directing each to fell and convey to Bangkok a supply of their finest timber, to be used at the ceremony of cremation. Several thousand logs will by these means be gathered together, and it is ordered that they should be of the largest possible sizes.

Krabin, Watsana, and Aran have each to furnish two hundred, and when we consider that the two last-mentioned towns have to drag their timber with buffaloes several days' journey overland, we may conjecture that the people will find their duties laborious as well as unremunerative. While, as each year seems to open at Bangkok with some extraordinary festival, it is rare that a two month process in which they escape this imposition.

I conclude this memorandum by remarking briefly on a matter which, at the last moment only, has presented itself to my notice. It has been stated by the late Monsieur Pallegoix* that, at a particular season of the year, a large and savoury fish called "*Pla Sawai*" is taken by the fishermen of the Cambodian lake; and that, being cured by them with the ashes of the palm-tree, it derives a sweet and agreeable flavour from the process. I must regret that my attention was not called to this subject till I had returned from Cambodia, and that I therefore made no enquiries about it on the spot. I subjoin, however, such information as I have since been able to gather.

There are several varieties of fish which are classed by the natives under the name of "*Pla Sawai*," and all of them are taken and cured in considerable numbers; of these a small portion is annually prepared by the process above alluded to, which may be described more particularly as follows:—

When the sugar-palm, which is found abundantly in the adjoining districts, has become so lofty and aged as to cease yielding sugar, the fishermen fell and burn the trunk, and steep the ashes for a few days in water; having made ready their fish by cleaning and decapitation, they soak it twelve hours in the above solution, and afterwards dry it in the sun. Fish cured in this way are reported to be exceedingly savoury, but their price considerably exceeds that of the ordinary kind, owing, as we may presume, to the difficulty in obtaining an abundance of the palm-wood. Few of them, I believe, find their way to Bangkok, as they obtain a ready market among the wealthier classes in Cochin China to which country the bulk of them are exported. It is said also that they form acceptable presents to the noblesmen and government authorities.

* '*Royaume Thai ou Siam.*' Par M. Pallegoix. Paris, 1854, vol. I. chap. ii. p. 51.

APPENDIX.

A TABLE OF WEIGHTS, MEASURES, CURRENCY, &c., used in CAMBODIA.

Measures of Weight.

A Siamese Tical	=	13 $\frac{1}{4}$ Avoirdupois.
A Siamese Pound	=	2 $\frac{1}{2}$ "
A Chinese Pound	=	1 $\frac{1}{2}$ "

Dry Measure.

A Siamese Khanan	=	14 English pint.
A Siamese Bucket contains	=	20 Khanan.
and therefore	=	34 English gallons.
A Siamese Cojan	=	375 "

Measures of Length.

1 Siamese Wai	=	6 feet 6 inches.
1 Siamese Sok	=	13 $\frac{1}{2}$ inches.
A Siamese Kam	=	the breadth of a man's fist.

This last measure is used in determining the diameter of a log of timber, this is ascertained by the somewhat inaccurate process of measuring first the girth of a tree, and then counting the number of Kam, or fist-breadths, in half that circumference.

Currency.

A Siamese Tical may be calculated at	
2s. 8d. a cahn, and weighs 136 grains Troy.	
1 Tical contains 4 Saangs.	
1 Saang " 2 Fongs.	
1 Fong " 4 Pans.	

The Siamese Months contain 29 and 30 days alternately. The first month generally commences about the middle of December, but is subject to a little variation.

A List of the Twenty nine Chief Towns in the Kingdom of Cambodia, with the Tulen of their present Rulers.

Name of Town.	Title of Governor.
Kampong Sawa.*	Phya Duxo.
" Sam.	" Monin Poldi.
Muang Pen.	" Sen Nian Pa.
" Sang Tring.	" Pajh Xé.
" Chang Phum.	" Phet dai-xé.

These five towns are under the supreme jurisdiction of Soudetch Chao Ka Paabak.

* Ten smaller towns are under the jurisdiction of the capital.

A List of Cambodian Chief Towns, etc.—continued.

Name of Town.	Title of Governor.
Muang Krang.*	Phya Phusalók.
" Bati.	" Wongsa Angxit.
" Phrai Karabat.	" Chajuthā.
" Pottēmat.	" Utthra Thi Bōdi.
" Piem.	" Rajah Sābthā.
These five towns are under the supreme jurisdiction of the Phya Umerak.	
Muang Sābung Khāmoom.†	" Orāchune.
" Sambok.	" Nājok Chantakhram.
" Simboom.	" Montri Chonlābot.
" Chālōng.	" Sena Chōnābot.
" Kunchor.	" Montri Nīkhōm.
These five towns are under the supreme jurisdiction of H. E. the Phya Wang.	
Muang Bah Pēnōm.‡	" Tharāmā Daixō.
" Phrai Weng.	" Nara Thibōdi.
" Ramdoen.	" Loo Chākkri.
" Sāwai Thiap.	" Chaiju Song Khram.
" Piem Xō.	" Thibōdi Song Khram.
These five towns are under the supreme jurisdiction of the Phya Kralahome.	
Muang Pōttisat.§	" Songkhālōp.
" Lapeja.	" Sāren thi bōdi.
" Bortboon.	" Sena thi bōdi.
" Krong.	" Rūthi Song Khram.
" Kampong Sēm.	" Thibet Songkhram.
These five towns are under the supreme jurisdiction of H. E. the Phya Chākkri.	
Muang Kampot.	" Sena Nāchit.
This town is under the supreme jurisdiction of Phya Tamaripinit.	
Muang Samrong Thong.	" Othai Thirāt.
This town is under the supreme jurisdiction of Phya Phaijai Thakrā.	
Muang Tāwēk.	" Sen Sānā.
This town is under the supreme jurisdiction of Phya Bākhā Tamarō.	
Muang Penompein.	" Rajah Maitri.
This town is under the supreme jurisdiction of Phya Thakrā.	
Sākdā Chao Krōm.	

* Four smaller towns are under the jurisdiction of this capital.

† Four smaller towns are under the jurisdiction of this capital.

‡ Four smaller towns are under the jurisdiction of this capital.

§ Four smaller towns are under the jurisdiction of this capital.

Particulars of the Maps of Cambodia and Cochín-China executed by French Government Surveyors, with information as to where they may be obtained.

Exposé Cochín-Chine et Cambodge. Carte Générale. Résumé des travaux exécutés par ordre de M. le Vice-Amiral Charrier en 1861 et M. l'Amiral Bonard en 1862. Par MM. Manet, Yuleu, et Herard, Sous-les Commandes Hydrographes de la Marine. Publié par ordre de l'Empereur sous la direction de M. le Comte P. de Chasseloup-Laubat, Secrétaire, &c. Au Dépôt-général de la Marine en 1863.

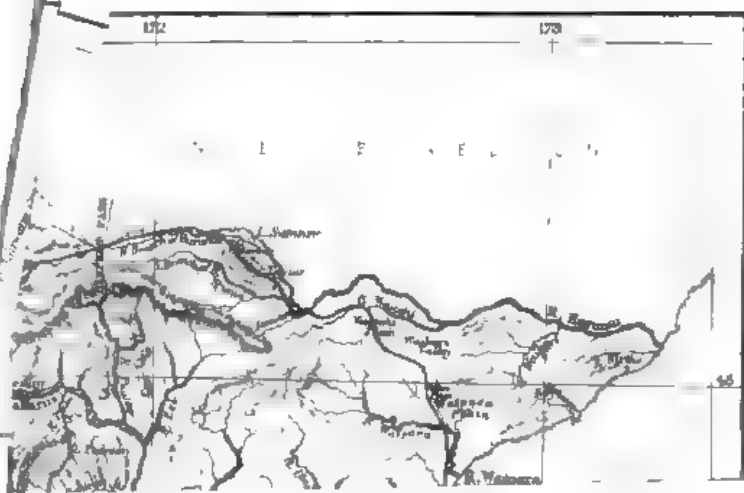
To be sent in four sheets, probably in eight also.

XVI.—*Altitude Sections of the principal Routes between the East and West Coasts of the Province of Canterbury, New Zealand, across the Southern Alps.* By JULIUS HAASST, PH.D.
F.G.S., F.L.S., &c.

No better insight into the structure of a country can be offered to the physical geographer than carefully prepared altitude sections, extending in various directions, and sufficiently numerous to afford opportunities for comparison. I thought, therefore, that in laying the accompanying sections and maps before the Society I might thereby contribute a share towards the better knowledge of the structure of this island, which has been again brought so prominently before the public, since the opening up of the mineral resources at the west coast.

When the rush to these gold-fields began to assume such dimensions that thousands of persons started overland from Otago and Canterbury, and the other neighbouring provinces, to this new Eldorado, one pass alone was known, namely, that by the Hurunui and Teramakau, over which a bridle-path, cut through the bush at the worst places, led to the west coast.

As this route was considered to be rather circuitous, several parties were sent out by the Provincial Government of Canterbury to find if possible other passes near the head-waters of the Waimakariri and Rakaia. From this resulted the discovery of Arthur Pass, near the head-water of the Waimakariri by Messrs. Arthur and George Dobson, and of the so-called North Rakaia Pass by Messrs. Browning and Griffiths. You are well aware that a pass had been discovered previously by myself near the head-waters of Lake Wanaka, leading into Open Bay, and another by the late Mr. H. Whitecombe near the glacier-sources of the Rakaia and Hokitika Rivers. In both these cases the western rivers were followed to the sea-coast; but the discovery of the latter route resulted in the death of the talented and



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energetic engineer Henry Whitcombe, who was drowned at the mouth of the Teramakau, when close to a Government dépôt at the River Grey.

The route by Arthur Pass was selected by the provincial engineer as it was not only the most central, but also, considering the rugged character of our Alpine ranges, because it presented less difficulties than any of the others.

Each route had, however, its advocates in the public press and in the legislative assembly, and as there was no time to make altitude sections by astronomical observations, or even by means of the spirit level, I was instructed by the Provincial Government to prepare them by barometric observations. I already possessed the necessary material for such a purpose, which I obtained on previous journeys between the east and west coasts by Harper Pass, or the Teramakau and Hurunui rivers, and by Haast Pass, or the Makarom and Haast rivers. I started, therefore, in the spring of last year (October, 1865), furnished with a set of three good aneroid barometers by Negretti and Zambra, and other necessary instruments, and took a series of altitude observations by the Waimakariri over Arthur Pass, down the Otira and Teramakau rivers to the west coast, returning by the Hokitika River and its tributary the Styx thence across a saddle at its head, descending into the Ararua River, which brought me to Browning, or the north Rakaiu Pass. After crossing this pass, still covered deeply with snow, I returned by the Wilberforce and Rakaiu to Christchurch, and prepared immediately after my arrival the four altitude sections.

Since then I had an opportunity to visit also Whitcombe Pass, and collected all the necessary data for the fifth section, which I added to the others, so as to complete the five routes across the central chain in this province.

It will be observed that I have fixed upon the highest point reached by each route on crossing the central chain, as a starting point to both coasts, as by so doing not only the distance of that particular point from the east and west coasts is clearly shown, but also the comparative lengths of road to be traversed, as well as their principal characteristics compared one with another.

In the table overleaf I have given all the principal numerical statistics of these different routes, namely, their total length, and the distance from the summit of the passes to the east and the west coasts, which, for comparison, is not without interest.

The shortest route to the west coast is therefore by the Rakaiu and Wilberforce, over Browning Pass, thence down the Ararua and Styx rivers to Hokitika. This is only 121 miles; whilst the longest is that which starts from the east coast, near Arowhenua, and passes by Lake Wanaka, across Haast Pass, and measures

226 miles. But the routes by Arthur and Harper Passes will always be preferred by travellers, as they are seldom obstructed by snow, and are not subject to avalanches.

Routes between the East and West Coasts of the Province of Canterbury.*	Altitude of Summit of Pass in Central Chain, in feet	Total Length in miles	Length from Summit of Pass to East Coast	Length from Summit of Pass to West Coast
Rakain:—				
Wilberforce route by Browning Pass	4545	154	103½	50½
Whitcombe's route by Whitcombe Pass	4212	147½	107½	40
Waimakariri:—				
Route by Arthur Pass	3038	148½	101	47½
Hurunui:—				
Route by Harper Pass	3008	146	102	44
Wanaka:—				
Route by Haast Pass	1716	226	182	44

A glance at the different sections and the preceding table will show at once that the western slopes of the central chain are by far the steepest, and of course the shortest. Thus the section by Whitcombe Pass, which follows the beds of the most important rivers of each coast, namely, the Rakain on the eastern, and the Hokitika on the western slopes of our Alps, gives us a clear insight into the fall of both rivers, and shows the remarkable difference between the length of their courses and their gradients. Thus, whilst the Rakain, which is 85 miles long, has

* These distances have been measured on the map of the province, and as they pass very often over ground which has only been sketched in, it is almost needless to say that they are only fair approximations. Since these sections were constructed by me, the road by Arthur Pass, from Christchurch to the mouth of the Araroa, has been carefully leveled and measured by the Public Works Department, with the following result:—

Altitude of Pass in central chain	3015 feet
Total length	14 miles 58 chains.
Length from summit of Pass to east coast	94 " 6 "
Length from summit of Pass to west coast	47 " 52 "

† Two good sets of observations, obtained during my last journey on March 31, 1866, give a somewhat different result for this the highest available pass in the province, namely 4551 feet, or 105 feet higher than the altitude calculated from a single observation in November, 1865. I think that the result obtained at the latest date claims more correctness, for not only had I a double set of observations taken during fine weather at the regular hours observed at the Christchurch meteorological station, but I had also the advantage of a further check for my calculations by taking into account the observations taken at the Hokitika meteorological station, which did not exist when I travelled over this pass in the beginning of last spring.

an average fall of only $39\frac{1}{2}$ feet per mile from the Ramsay Glacier its source to the sea, the Hokitika, 40 miles long, has from the Sale Glacier to the west coast a fall of $118\frac{1}{2}$ feet in the mile. This difference is still more remarkable if we compare the course of the Waitaki, which is 117 miles in length from the terminal face of the great Tasman Glacier (2772 feet), and is the longest and largest river of our province, with the opposite Waiau River, which is only 12 miles from the terminal face of the Francis Joseph Glacier (708 feet). This gives $23\frac{1}{2}$ feet fall for the eastern, and $57\frac{1}{2}$ feet for the western river. The latter would have of course a much greater fall, considering the close proximity of the summit of the central chain to the coast, did not the Francis Joseph Glacier descend to such a remarkably low position.

A few words of explanation to each line of section will not be superfluous, as not only will it assist the examination, but as there are many peculiar physical features in each route which these sections cannot entirely convey, and to which I draw attention.

Wira Section.—The road ascends the Canterbury plains to near the junction of the Kowai with the Waimakariri, but instead of crossing that tributary and following the main river through the gorge on the northern slopes of the Mount Torlesse range, which presents very many obstacles, the road ascends the Kowai to the junction of the two main branches, and so brings us to Porter Pass, which separates the Mount Torlesse from the Thirteen-mile-bush range. According to my altitude observations Porter Pass is higher than Arthur Pass, and thus we find that the approaches lead over higher ground than in the pass across the central chain itself.

From here to the Craigieburn Saddle we find ourselves in a tertiary basin, traversed by several tributaries of the Waimakariri, which descend from the Craigieburn range. This bleak chain of mountains, about 7000 feet high, forms the watershed between the former river and the Rakia. Descending more than 700 feet, we reach Lake Pearson and the glacialized country of the Waimakariri, where the hills are remarkably rounded, and large open tracts, now covered by massive accumulations of alluvium, the former bed of the huge postpliocene Waimakariri Glacier, are traversed.

The road reaches the valley of the Waimakariri after crossing the River Cass, and runs for several miles along the slopes of the outtrunning spur on its southern banks. It afterwards descends into the river bed, and crosses a succession of fans of southern tributaries till opposite the junction of the Bealey,

where the road leads across the main river and follows the latter tributary to Arthur Pass.

When examining the Alpine passes of this province, I observed that invariably a glacier descended on each side, going in a different direction; and although near some of them the glaciers have retreated in the ranges, on both sides, several thousand feet above the present watershed, the glacier-slopes and remains of lateral moraines, with which the surrounding mountain-sides are covered, show at once that much larger glaciers existed formerly in those localities.

These extensive ice-masses have, without doubt, planed the central chain on both slopes and in opposite directions, till the ridge has been worn down to its present form. Dr. Hector made the same observation in the Otago Alps; and thus we observe again how nature, to obtain gigantic ends, uses very simple but effectual means for their accomplishment. The same remark applies equally to Arthur Pass, where remains of moraines going in opposite directions, and the course of the present streams by which the Bealey and Otira rivers are formed, give additional confirmation to such a theory.

I may here draw attention to the peculiarly slight ascent of the Bealey as compared with that on the Otira side, which is characteristic of every portion of our central chain, although in this instance we must not lose sight of the fact that the Otira is a much larger river than the Bealey, and that, consequently, the power to excavate its bed deeper was so much greater.

After a few miles, the gorge-like character of the Otira changes, and we emerge into a large valley, which has all the features peculiar to our shingle rivers, and which leads us into the large open valley of the Teramakau. Instead of following that river to the ocean, the road 24 miles above its mouth once more descends the low western slopes of the central chain, here consisting of great gold-drift, reposing without doubt on tertiary beds, and descends again by the Mawhaki Creek into the bed of the Arakura, bringing us thus to the west coast.

Harper Pass, between the head-waters of the Hurunui and Teramakau, is the second pass which from its low position and easy access recommends itself to our attention. It was the only one in use by the natives of the province, and was therefore known and traversed for many years.

An excellent dray-road brings us to the Waitohi Gorge, where a bridle-track begins and leads across the Waitohi Saddle, 1508 feet high, before we reach the valley of the Hurunui. This saddle, like that over Porter Pass on the Otira Road, could have been avoided by following the main stream from the

Hurunui Plains; but as the gorge-like character of its bed would have offered serious impediments, only to be overcome by very great outlay, this saddle was preferred as a natural road. Even now, when the bridle-track reaches the valley of the Hurunui, it leads along the precipitous sides of the southern ranges, which are remarkably bold and rugged, as far as the junction of the Southern Hurunui.

The track, when it reaches the lake regions, instead of following the main river to Lake Sumner, ascends a high shingle terrace and brings us to Lake Taylor, which lies 251 feet higher than the principal lake, and from which we descend by Lake Catherine in one of those remarkable glacier channels into the bed of the Hurunui, a little way above its fall into Lake Sumner. This bed has, like all our rivers above the Alpine lakes, a straight valley to its source, and in which it meanders in many branches. The road follows this river-bed, beautifully wooded on both sides, to the foot of the pass, and an easy ascent of about 300 feet brings us to the summit. Like Arthur Pass, it is on both approaches and on the mountain sides covered with sub-alpine vegetation, whilst the saddle proper is formed by swampy ground with small waterholes at different levels and with outlets in opposite directions. The descent into the bed of the Teramakan is far more rapid than the ascent by the waters of the Hurunui.

At the same time the source-branches are far more important, and form, after having descended 1500 feet in a few miles, a river much larger than the Hurunui on the opposite side. This western valley has a straight course, and can, even without a road and when the water is not high, be followed with horses to the west coast by swimming across at a few localities in the gorges below the junction of the Waimera where the river breaks through the low tertiary ranges.

The *North Rakaiu Route*, by Browning Pass, does not, with the exception of the pass itself, present any serious difficulties. The road follows the Canterbury Plains to the moraine accumulations beginning near the gorge of the Rakaiu, now mostly concealed under a luvial beds, to Fighting Hill, when it follows an old course of the Rakaiu, across several moraines.

Reaching the terraces of the Acheron, the road descends several hundred feet to the bed of that tributary of the Rakaiu, and ascends again considerably till it reaches the moraine lying above Lake Coleridge. A descent of about 100 feet brings us to the south-eastern corner of that fine sheet of water, now the head of the lake. In my section I have followed the old road by the Lake Seife depression, running between low ice-worn

hills across several small tributaries of Lake Coleridge, and after having reached the former lake followed its outlet to the Harper, a tributary of the Rakaiu.

Crossing the Harper a few miles above its junction with the Wilberforce, the road again ascends, crosses the numerous fens which unite the isolated ice-worn Scott hills to the main range, and descends above those *roches moutonnées* into the bed of the Wilberforce. Here the road crosses the stream, following afterwards along the base of the Cascade Range over good ground to the junction of the Stewart River, which is the principal branch of the Wilberforce.

Having crossed that river (Stewart) we travel by a good track to the southern base of Browning Pass, which rises about 1500 feet above the river. I may here observe that I was obliged to exaggerate the vertical scale in the sections, as it would have been impossible to show the details of these routes otherwise.

The steep slopes forming Browning Pass look, therefore, in this section almost vertical, and form a striking feature when compared with the other passes, the slopes of which are of a much easier gradient.

Having ascended the southern face of Browning Pass, passed along the small isolated lake situated on its summit, and crossed the ice-worn hills of which the summit is formed, we descend by the steep northern slopes into the bed of the Arakura, which, above the junction of the Harman, is so open that the traveller can advance rapidly by crossing and re-crossing; but immediately above that junction and for several miles below the river is confined between perpendicular cliffs, often several hundred feet high, which with little interruption continue till the river reaches the west-coast plains. The track, therefore, after passing the Harman Stream, leads along the eastern shoulder of Mount Sale instead of following the Arakura, and crosses a low saddle (the so-called Wooded Saddle), which brings us to the headwaters of the River Styx, one of the source-branches of the Hekitika. This stream has a remarkably straight course, and brings us into the west-coast plains.

Whitecombe Pass is another interesting pass. The road to it, so far as the south-eastern end of Lake Coleridge, is the same as the Wilberforce Road: here it diverges and follows the bank of the Rakaiu to above its junction with the Wilberforce.

Crossing the Wilberforce near its junction with the Rakaiu proper, the road leads along the slopes of Mount Algidus to the junction of the Whitecombe, the river-bed being too swampy to follow. Having crossed the Mathias at its junction, the road continues for about seven miles over a large flat on the northern

side of the river, where the stream sets against its banks, which are covered with dense vegetation and rise nearly perpendicularly above the water for a considerable altitude. The traveller has, therefore, to cross to the southern side, and to follow a grassy flat along the Arrowsmith range.

Having arrived at the point which projects most into the river-bed from that range, the last crossing is effected; and after travelling for a few miles over shingle-beds, we reach the junction of the Whitcombe Pass Stream with the Rakaiia. From here the remarkable opening through the Southern Alps is clearly defined. Following then the valley of this true mountain torrent over huge blocks of rocks and through dense Alpine vegetation, and crossing several large streams rushing down the steep mountains from several glaciers, we reach, after having ascended a *debris* wall stretching across the valley, the summit of the pass, when the interesting phenomenon of two glaciers going in different directions is still visible.

On the Sale Glacier the main source of the River Hokitika reaches still across the valley; and if the Martin's Glacier, the main source of the Whitcombe Pass Stream, would only advance a few hundred yards, the margins of both, and perhaps the ice-masses, would meet on the summit of the pass, although descending in different directions. The descent towards the west coast is more rapid, particularly for the first 400 to 500 feet.

For about ten miles on the western side the road follows the straight shingle valley of the river, which afterwards enters the wooded west-coast ranges, forming a succession of gorges, with rapids and waterfalls.

Jacob Loper, the surviving companion of the late Mr. H. Whitcombe, Government surveyor, has given us a vivid description of this portion of the route in a report to the Government. It is partly unknown to me, as I ascended the Hokitika River for only 30 miles from the sea coast.

Haut Pass.—There remains only that pass to which my name has been given, situated near the head of Lake Wanaka, and which lies so remarkably low, considering the altitude of the Alpine ranges on both sides. On the section I have shown the road I travelled by, which is that generally used by travellers in this province. By it two passes of greater elevation than the principal pass across the central chain have to be crossed, namely, Burke Pass, leading from the headwaters at the Opahi into the Mackenzie Plains, or upper valley of the Waitasi, and thence by Iands Pass into the valley of the Molyneux. Both could, of course, be avoided by following along the valley of that

latter important river; but as my object was principally to show the comparative value of each route to the province of Canterbury, I could not abandon the direct road leading to Lake Wanaka. My section shows the road which crosses these two passes leading thence to Lake Wanaka, and along the shores of that lake to Messrs. Stewart and Kinnis's station. From thence we proceed by water to the head of the lake, as there is much difficulty in travelling with horses along the shores of the upper portion of the lake, the country being very rough in many places. Thence to Haast Pass the road follows the valley of the Makariri and its tributaries by a very easy gradient, and then falls more rapidly for about 10 miles to the junction of the Burke with the Haast, when again the natural fall of the valley to the sea offers a remarkably fine highway between the two coasts.

In former publications which I had the honour to lay before the Society, I have described this road at length, so I need give no more details about it now.

On the Value of Barometric Observations, taken on a rapid Journey, for calculating Altitudes.

Since the altitude sections and the comparative diagrams were prepared, and the foregoing remarks were written, I have, through the courtesy of Mr. E. Dobson, the provincial engineer, obtained possession of the results, obtained by means of the spirit-level, for the whole Otira or Arthur Pass Road, which are personally of the greatest interest to me, besides possessing a high intrinsic value. Not only is there a very perfect altitude section of that important road thus obtained, uniting the agricultural and pastoral districts of the eastern side with the western goldfields, but it gives me also a very welcome opportunity to check my own barometric observations, calculated six months previously.

These altitudes, obtained by the Public Works Department, may, of course, be relied upon, as they have been twice checked, and the difference was found to be only a few inches.

Mr. Dobson has kindly allowed me to publish these spirit-level altitudes, which I do the more readily, as it gives me an opportunity to compare them in the following table with my own, obtained with three good aneroid barometers, and to which I beg to draw the attention of geographers.—

TABLE of ALTITUDES of the Road by ARTHUR PASS, across the Province of Canterbury, New Zealand, as obtained by the following observers.

Places of Observations.	Dr. I. HASSETT, Barometer, Adjusted, Nov. 1 st , 1906.	Spencer & Co., Includes 14 th mile W. C. & J. C. & J. C. Nov. 1 st , 1906.
	feet.	feet.
Cook's Accommodation House	217	218.10
White's Accommodation House	223	221.20
Southern base of Little Ravenhill Hill	225	225.30
Melton's Accommodation House formerly Wallis's	1727	1275.74
Southern bank of River Kowai	1787	1424.47
Centre of bed of River Kowai	1342	1393.62
Hastie's Accommodation House, foot of Porter's Pass	2.91	2060.00
Summit of Porter Pass	3234	3007.00
Lake Lyndon high-water line,	2854	2749.00
Spring across of River Porter	2620	2545.00
River end of Porter, where road crosses	2270	22.6.00
Summit of Terrace on its western side	2473	24.0.00
Bed of River Thomas	2214	2127.6
Accommodation House near Mr. Eoy's Station* (stable of Cobb and Co.)	249	2274.00
Top of Terrace of Broken River, western side	2413	2371.00
Bed of Broken River	2158	2084.00
Top of Terrace on its western side	2385	2355.00
Head near summit of Porangitua Rock	2760	2751.00
Bed of small creek near shanty	2414	2284.00
Top of Craigieburn saddle	2434	2671.00
Lake Pearson	2095	2085.00
Head crossing River Cass	1872	1874.00
Saddle between Cass and Waimakariri Goldney Saddle	1938	1929.00
Bed of Waimakariri, between the two cuttings	1883	1878.00
Crossing of Waimakariri	2055	2044.00
Breaker Township Police reserve	2355	2340.00
Foot of Arthur Pass Smith's Camp	2544	2477.00
Arthur Pass highest summit	3050	3043.00
Southern foot of main ridge	2697	2667.00
Summit of main ridge	2865	2825.00
River bed of Otira, first bridge	2020	2005.00
Junction of two branches of Otira near the stock yard	1440	1460.00
Bed of Teramohau near junction of the Otira, where the road joins the main river	709	731.00
Western bank of River Taupo, near junction of Teramohau	356	357.00
Warren, where the road leaves the Teramohau	148	148.00
Foot of Terrace	121	120.00
Summit of highest Terrace	647	652.00
Midstock station near Kawhaka Creek	410	425.00
Junction of Kawhaka with Ararua	145	104.00

* In my report this position was erroneously set down at 9548 feet above the sea, which is the true altitude of Mr. Eoy's homestead, which lies close to the accommodation house.

† We must admit an error in the readings, as the observations on both sides taken as now before and afterwards, agree very closely with the spirit-level.

It will be seen from these tables that my altitudes were in general a little too high. To produce this the difference in the state of the atmosphere at the meteorological station near the sea coast, and at the same time on or near the summit of the passes in the interior, may have had some influence on the readings of my instruments, not to speak of minor index errors.

The table shows thus once more convincingly that although mathematical correctness cannot be claimed for altitudes calculated from barometric observations, they are nevertheless sufficiently accurate for all practical purposes. And every observer must rejoice that even single observations, when carefully taken, possess more intrinsic value than is generally allowed to them.

I am afraid that these few observations will not be of sufficient interest to warrant my laying them before the Society, where receives such valuable and instructive papers from all parts of the world; but my desire to make geographers acquainted with some of the results obtained lately by me when enquiring into the physical geography of some portion of this beautiful island will, I trust, be sufficient excuse for my having done so.

Christchurch, December 27, 1866.

XVII.—*On the Subterranean Supply of Water in Bloochistan and the Hill Districts of Western Sind.* By J. W. BARRS Esq., C.E., F.R.S.E., late of H.M. Bombay Public Works Department.

HAVING resided the greater portion of the period since 1845 in Sind, where, from the scarcity of rain, water, and above all running water, is the "summer bourn" of the land, and where its economical application to irrigational purposes formed the nature of my duties on the Staff of Colonel (then Captain) F. our great hydraulic engineer, I had long entertained the idea that subterranean water existed in certain localities in the hills capable of overflowing through artesian borings if they were made, and in 1865 I determined, after a critical examination of the hills bordering Sind, to give this mode of obtaining water a trial.

The place selected for my labours was distant about 8 miles north-east of Kurrachee, and I had the satisfaction after some weeks' labour of piercing the first water-bearing stratum, when the water rushed up and overflowed the surface, continuing, without intermission, to flow to this day.

The water is of a temperature of 85°, and as the stratum in which it is found is a same aluminous shale, it is, from jet-

colation through the same, slightly brackish, but at the same time useful for irrigation; and although not such as would be preferred for household purposes, myself and the men engaged on this work used it so often for twelve months.

Most of the large springs in the hills proceed from the nummulitic formation which forms the back-bone of the Hala range, and are brackish. Springs frequently occur in the same locality as the more deep-seated springs from the nummulitic, but in a much more recent formation. I apprehend that wherever the superior aluminous shales yield, as in the case of my borings, a continuous flow of water, we may reasonably calculate on a larger and purer yield if the borings are continued to the lower tertiary strata.

Although I have succeeded, as mentioned, in getting a continuous flow of water, and that at a high level, it must not be inferred that this is the only proof of its existence. Within 4 miles of these borings on either side are natural springs, viz., two on the north-west at Muggur Par, aggregating a discharge of 180,000 gallons in the twenty-four hours, with a temperature of 126 and 98 respectively, and another south-west at Wapda discharging one-fifth of that quantity.

In another part of the hills within 40 miles of Kurrachee there are tracts of many square miles in extent covered with travertine, containing recent fresh-water shells, and from 10 to 12 inches in thickness, thus showing indisputably the flow of spring-water charged with bicarbonate of lime for a very long period. At Par Ghazee, near Schwan, is a remarkable spring, discharging one and a half million gallons per day, even a pressure 270 feet high. Indeed the whole of this portion of the hills, for a breadth of 100 miles from Kurrachee to Kaelat and the Boolan Pass,* contains such a vast number of springs and small streams that it is impossible to detail them. Many of these are used up in irrigation and a still greater number, after flowing from one to ten miles, disappear in the sand, or flow off into ravines of the Eocene formation through which they pass, to appear again, doubtless, in places at a lower level, where faults bring the water to the surface.

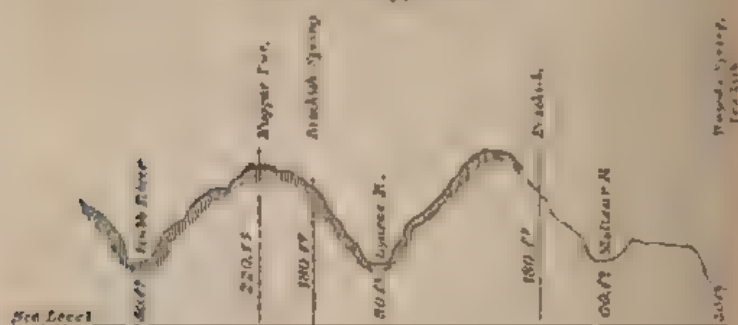
In proof that these springs, and consequently the subterranean water generally, derive their head of water, and therefore their first source, from some spot far removed from their immediate locality, I should mention that most of them at their point of issue over the surface of the ground are from 60 to 300 feet above the valleys in their own immediate parallel. Thus, for instance, the spring at Muggur Par † flows to an elevation of

* Vide Mission's 'Tour in Afghanistan.'

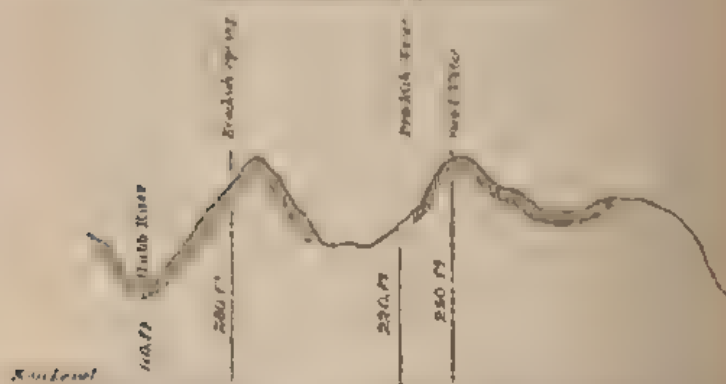
† Nine miles from Kurrachee.
1. 2

220 feet above sea-level, whereas the water, in the two valleys between which the hill giving rise to this spring is situated, is not more than 80 feet. Again, at a section across the country east and west, 25 miles north of Kurraheer, the subterranean water issues at 280 feet above sea-level, whilst the Habb River in the adjoining valley stands at 110 feet.

Section at Mugge Par.



Section 25 miles north of Kurraheer.



Many other sections would give somewhat similar results.

With this evidence of the presence of subterranean water we are bound not to stop in our inquiries, and hence arises the question, where is the source?

In dealing with this question we start with the absolute certainty that wherever water is found inland, whether in the shape of springs or rivulets, it has but one origin, namely, the supply from the clouds in the form of rain and snow.

We are in the habit, because some large portion of the zone just beyond the Tropics contains vast deserts, and has no rivers

draining towards the ocean, that there is literally no rainfall; but it is a mistake; even Sind, which is spoken of often as being destitute of rain, enjoyed a rainfall of 40 inches in some parts within three months last summer, and averages I believe four inches per annum. But if we glance at a map of Asia, we observe between the eastern borders of Persia and the western boundary of the Sind and Punjab valleys a tract of country 334,000 square miles in extent, with an enormous area of mountain land from 3000 to 12,000 feet above sea-level, and, as Pottinger remarks, "subject to heavy falls of snow; showery in the months of September and October, and the whole of the cold season (viz., from November to March inclusive), more or less so; so that four or five days seldom pass without either sleet or rain. Even Mikan and Lüs," he goes on to state, "have their wet season in February and March, and also June, July, and part of August."

I have no doubt that these remarks refer especially to the mountainous tracts of Afghanistan and Beloochistan, and not to the desert portions of Seistan to the west and south-west.

I have not obtained access to any meteorological registers of this region, and therefore endeavour to arrive at an approximation of the average rainfall by other means. For the purposes of this paper I think I can show sufficient *a priori* evidence of considerable rainfall in the mountainous parts of these countries, and that consequently there must, as is the case in every country in the world, under similar circumstances, be a considerable subterraneous supply available in that tract lying to the southward of the 30th degree of latitude.

As regards the subterranean supply in the Hills from Karachi north to Khebat, I am of opinion that, if no other access were available, the proximity of Khebat to Karachi, viz., 200 miles, its position with regard to the slope of the country, which is north and south, and its being the southern terminus of an elevated range of mountains, from 8000 to 12,000 feet above sea-level, culminating in the great lateral range of the Hindoo Kesh, running east and west (portions of which are covered with perpetual snow), I am of opinion that this range alone, on the elevated parts of which snow lies for many parts of the year, must be an enormous source of subterranean water.

Turning to the map, we observe that the rainfall of the region comprised within a line from Khebat through Ghuznee on the east, the 30th degree of latitude on the south, the 34th degree of latitude on the north, and the longitude of 62° on the west, culminating to one point, viz., the Lake Hamoon, or, as it is known to geographers, the "*Ar. a. Palus*," a hydrographical basin equal in extent to that of the great River Euphrates, viz.,

108,000 geographical miles, like those of the Helmund and its tributaries, are lost in a sea of marshes.

Most travellers agree in assigning the dimensions of this lake during the period of the melting of the snows to be 70 miles long by 15 to 20 miles in breadth; or, in round numbers, say 1000 square miles, whilst Pottinger leads us to understand that its ordinary dimensions are 30 by 12, or say 350 square miles. This, I believe, will, until it shall have been further investigated, enable us to roughly estimate by analogy the average rainfall of this watershed.

In Soud, viz., the interior I have found ponds to lose one inch in depth per diem from August to January, and lakes in the Thauri Desert to lose half an inch per diem until they decrease so much in depth as to receive their equivalent in evaporation from springs.

In Calcutta (a humid climate) 15 feet per annum is the amount proved by registry, being nearly half an inch per diem; whilst at Greenwich 4.5 feet is allowed, in Bombay 26 of an inch is the amount of daily evaporation during the dry months; and although it is generally supposed that evaporation is considerably less over large areas than small ones, still these registries refer to evaporation pure and simple, and do not include the portion due to percolation. This lake is described as being nowhere more than 3 to 4 feet in depth, and covered with reeds. Captain Conolly says that for four months in the year, during the summer solstice, evaporation must be excessive, from the absorption by the scorching rays prevalent in that season; indeed when, as Major Rawlinson informs us, the summer heat in a bungalow is 120°, and the temperature of running water at Bushire 100°, we must assume for evaporation, vegetation, and percolation, during the four summer months, when we know no cow can possibly toll, at least one inch per diem, and for the other eight months let us assume the loss from those causes not to exceed a quarter of an inch per diem; it will then be found that, although this allows for a discharge from all the rivers combined of 1,613,533* cubic feet per minute during the four months when snow is melting, and 141,106† cubic feet per minute during the other eight months (the discharge of the Euphrates being estimated at 14,214,466 cubic feet, or nearly nine times the estimated discharge of the Helmund and the other rivers flowing into Lake Hamoon) it only represents 1.51 inch, or a little over an average of one inch of rainfall per annum.

Now we have a perfect right to assume that this quantity of 1.51

* Equal to 40 such rivers as the Thames, at 9000 c in the summer flow.

† Equal to 52 such rivers as the Thames in summer flow.

inch per annum is at least only one-third of the average rainfall, which would give us a total average rainfall of 1 inches per annum over the area of this geographical basin; and as we know that in every country in the world a portion of the rainfall, estimated variously from one-tenth to one-twelfth, percolates and is absorbed by the soil and the permanent strata, and that the whole of this basin is elevated much above the sea-level, and that according to tradition the Helmand formerly discharged itself into the Indian Ocean, there is room for a strong inference in my opinion that a vast body of water is available, in the whole of that region between the 30th parallel of latitude and the sea. It is recorded by navigators that large springs of fresh water burst up through the sea in the neighbourhood of Cape Ormuz, the same thing has been observed off Cape Monge; and I doubt not if attention were called thereto the same phenomenon would be observed in other parts of the coast. The formation of this part is undoubtedly tertiary, and the stratification of the hills where not horizontal generally inclines either to the eastward or southward. It will be recollected that under somewhat similar conditions the French engineers a few years since have brought a permanent flow of water in many parts of the Algerian Desert.

I regret that I have felt it necessary, in order to attempt to convey my ideas and information on this very interesting subject, to have been led into such a lengthy paper, and should it have no better effect than to excite inquiry and attention to this subject, I shall consider the labour I have bestowed amply repaid.

XVIII.—*Notes on the Pangong Lake District of Ladakh, from a Journal made during a Survey in 1863.* By Capt. H. H. GODWIN-ALSTEN, F.R.G.S., Topographical Survey.

Read, December 10, 1866.

To the north of the Indus, from its junction with the Dms River, lies a high range of mountains which separate the Indus drainage from that of the Shiyok or Nabra River. The axis and great mass of this range is granite; on the west this extends to within a very short distance of the river, while at Pituk below Lash, the granitic hill on which that large and well-known monastery stands abuts on the Indus itself, and thence towards the east for a considerable distance it holds the same position. The great mass of coarse sand-stones, red clays, grits, and conglom. rocks, seen on the right bank of the Indus, west of Pituk, are now seen on the left or south bank, thence to the

east in the direction of Stock and Himix. On the above granite range are several passes leading into the Shavek Valley, all of great elevation; and on the direct road from Lad. to the Pangong Lake are two, viz. the "Chang La," and the "Kay La," both high, being respectively 17,170 and 18,250 feet above the level of the sea.

The ascent to the first is gradual from the village of Tagar in the Chumray Valley, which there divides into two large ravines: the western branch leading to the Wari La, while the eastward runs up to the two passes above mentioned. On the 15th July, when our party crossed the Chang La, the snow that had laid in the early part of the month still lay; we all suffered more or less from the effects of the rarified air. On the return journey via the Kay La, 80 feet higher, scarcely a man suffered from this cause: we had then been living for some time at a high altitude, which very probably had not a little to say to our immunity from the fatigue and headache engendered at high elevations. The mountains on the northern side are perfectly bare, a little grass growing only along the bottom of the valley, which had a steeply easy slope the whole way to Dargo, and the scenery is not remarkable save for its large scale and bleakness. Before reaching the village of Dargo, one emerges out of the narrow valley upon the level surface of one of those large accumulations of alluvial sands and shingle that are seen along the large valleys of these mountains. The powerful force that accumulated the materials that form them is now extinct, and the circumstances attending their formation, and, more wonderful, their subsequent denudation, are as yet but little understood. At this spot the vast securing process was well exemplified: the level of the plateau on which I stood could be traced across the valley in and out of its numerous ravines in a perfectly horizontal line of a different colour, where very small portions of the alluvium still adhered to the slopes and precipices; and I do not think I am exaggerating when I state that its thickness at the junction of the streams below Dargo was over 1,500 to 2,000 feet. The whole valley is very open—low cliffs of alluvial sands and clays can be traced the whole distance on both sides—and it is self-evident that at no very distant period this presented a long race of water; an after sojourn on the Pangong fully confirmed this.

From Dargo to Tankas is a distance of 8 miles, and the road quite level. The stream is considerable, and contains a small kind of fish, of which I saw numbers at the Dargo bridge. Mountains rise to a great height on either side; and at the southern end of the valley, towering above Tankas, is a fine snowy peak, called Tankas No. 1. The village of the same name

large, and a very fair area under cultivation. Many of the houses are built close under a large mass of conglomerate, the stones firmly cemented in it, and to this cause it must owe its present existence at the mouth of the narrow gorge towards the Pangong, out of which the soft loess have been washed away. The main stream comes from the southward, and drains the Lung Yaglna Valley and the mountains on the north of the Irans River. It is joined at Tankah by the small stream that drains the valley up which the road to the Pangong runs; this is at first rather shut in and confined by the mountains that rise in hills on either hand, but where it takes the more direct easterly direction it opens out considerably; high cliffs of the alluvial shingle deposits again occur, forming a belt at foot of mountains of the northern side, about 300 feet high, and some 400 yards distant from the stream. The physical appearance of the whole length of this valley showed unmistakable signs of its having at one period been the bed of a lake. I am induced to think for a part of that time it was continuous with the portion below Tankah, and that the mass of a lacustrine above Pangong was contemporary with that above Magdh. Above the two lakes, Tragume Bur Tso, there is no longer any water in the bed of the stream save at intervals here and there, where it breaks out in a small rill to lose itself in the loose gravel a few yards lower down. Over distances of more than a mile it is deep white sand, the collection of which is a good deal due to the wind. Down to this sand the talus from the mountains extends, tending every year to increase the height of level. At the low pass of Surtokh, whence one obtains the first view of the Pangong Lake this action is nowhere so well seen; this ridge of Surtokh forms the watershed, across the natural exit for the waters of the great lake, and it is entirely formed by the loose shingle brought down a somewhat large lateral ravine from the snowy peaks to the south. This bed of talus actually divides, part to the eastward, part to the west, so that the waters may in some years flow one way, in others another. If the supply of water to the Pangong Lake were equal to what it must formerly have been, when the glaciers were double their present size, the continual flow of water would soon carry off these talus accumulations from the mountains above Surtokh; there being now no force in action for this purpose, the snows of winter and the waters of the side ravines tend to raise the main valley-level every year.

The Pangong Tso (lake) is about $2\frac{1}{2}$ miles distant from the low ridge of the Surtokh La, or, more properly speaking, its natural air or land, but the level of the old lake-bed extends up to within a very short distance of the pass. A rise of 150

feet in the waters of the present lake would find them again an exit down the valley to Tinkse. A trigonometrical station has come to the water's edge; its height has been determined trigonometrically to be 13,931 feet above the sea. From this mark-stone a fine view of the first long reach of this elevated and interesting piece of water is obtained. Its colour is of an intense blue, the water as clear as crystal, but far too saline to be drinkable; there was quite a salt-water lee in the air as the wind blew off it. Knobs and peaks were seen for miles a mile along the spurs that descended from the ranges bounding the northern shores. From the height at which one stood, these all appeared comparatively low, only on the highest lay a few small patches of snow, thence to their bases was one succession of shades of yellow, purple, reds, and browns, the invariable colouring of Tibet, not a scrap of green.

The Pangong Hill Survey Station is a short easy pull of some 1000 feet above the lake, obtaining a most commanding view, up and down it, across the spurs of north bank and high up among the snowy peaks to the south, where small glaciers just show above the masses of the old moraine, which extend down to the level of the lake. Little streams flow down these steep inclines, like silver threads, from the ends of these glaciers, to finally lose themselves in the silt and sands that skirt the edge of the lake, for only the most considerable of these streams find an exit in its waters. Such is the one that flows through the ice-basis of Mun; it owes its size to the streams from three glaciers, uniting some distance above the village. The silt brought down by these has formed a miniature delta or arm of shallow water running out into the lake. In the course of a conversation with the soles and men of Mun, I learnt that, some three or four centuries on the lake narrowed to a mere stream which was fordable, and that it was not necessary to follow the northern shore. On the 22nd July my march lay over the sandy, stony plain, skirting the shore of the Pangong, crossing two or three ravines, where sections are well displayed of former and higher levels of its waters, in sands interstratified with an angular rubble like that distributed over the present surface. At about 8 miles from Mun, the straggling village of Monik is passed on the right hand, and the last on the lake — Larkpor — is 3 miles farther. The level ground between the shore and the foot of the mountains increases much in breadth as one proceeds east, and the stream from Chushol gives from a distance no sign of its proximity; and I was rather surprised on coming suddenly upon a fine body of water, flowing with a quiet current through a narrow belt of green grass, some 10 feet below the surface of the plain. Finding plenty of wood and a

nice green sheltered spot under the bank, I pitched camp by the side of it.

The extent of level ground here is considerable, quite 10 square miles, dotted over in the vicinity of the stream with a few low bushes, and over the rest grows a stony coarse grass in tufts. Towards the shore of the lake rise two very conspicuous isolated low rocky knobs, a mile apart, and between these is the confluence of the Chind stream and the Pangong Tso. The next morning I walked across and ascended the most western eminence, having the strange sounding name of Tuggu Nuggu. This had formerly been a fortified post; the level space at the top was enclosed by a low stone wall, while a detached outwork had been built on the low spur that ran out on the east side; none of my coolies, who were all from this district of Pangong, could give me any account of it, as to when or by whom it had been built. It must be comparatively an ancient work; still, considering how soon events are forgotten by such men, its age may be only 150 to 200 years. It was a lowering morning, and, before I had finished my survey work from this position, it came on to rain hard, when we sat out on the top. The shower passed off up the lake, and it had a fine effect on the view in that direction, with the lines of falling rain over the expanse of water and the misty mountains bounding its sides. The state of the plain, which, when dry, is covered with a hard incrustation of lime and a salt that cracks under the feet, had now, by the wet, been turned into a sticky mass, that adhered to the boots in huge lumps and remained like a cement upon everything it came in contact with. One and a half mile beyond Tuggu Nuggu low spurs abutt upon the lake in cliffs of 100 to 200 feet high, and the way leads along the narrow shore at their foot, with very deep water washing the bank. Passing one large bay we rounded a low narrow point of beach only to find the existence of another bay, called Phusook; this forms the boundary between the Kashmir Raja's territory and the Chinese district of Rudokh.

Phusook formed a circular, sheltered little lake in itself. A narrow strait or v connects it with the water outside. It was evidently of great depth in places where the hills came down in cliffs upon it; a narrow beach ran along the foot of these, formed of talus cemented by lime. The bay formed a perfect harbour, in which a hundred battle ships might have floated, and sailed in and out of it. Were this lake in a less elevated region, or on a line of travel, how useful would the watercourse have been on private and down the extent of its two long portions. The first or lower lake is 10 miles in length the second 10, giving a total of 73 miles, exclusive of the upper long portion beyond the

Nyak, which is quite 18 miles. The first thing that must strike any one of observation, is the evidence of this lake having been formerly fresh, for its entire length. Myriads of dead fresh-water shells now strew the shore. These, thrown up by the waves in a long white ridge lie so thick in some of the bays, they can be taken up in handfuls. They are principally of *Lymnaea* and *Planorbis*, but, though I searched diligently I never found a large bivalve: only one very small *Piscina*, that I found inside one of the specimens of *Lymnaea*: nor did I ever find a living specimen, which I had hoped to do in the upper lakes, where the water was very slightly brackish. When this shell existed, the former lake must have had quite a different aspect from its present one; and in it must have grown, for the sustenance of its molluscs, beds of water-plants, while its banks would have been fringed probably with grass and rushes.

There is a point in the history of the Pangong Lake on which may be based a good deal of theory as to its later aspect: it is the former size and extent of its waters. On every side unmistakable traces that the level was much above the present one are seen in the lines of old beaches and in the beds of sand, containing the fossil remains of fresh-water shells, interstratified with beds of angular debris, which, as I mentioned before, are to be seen in the little dry ravines that cut through the plain.

These sections prove great changes, and also I think, that the lake existed prior to, certainly during the latter part of, the great glacial period in the Himalayas. Whether the scouring out of the depression in which its waters lie is due to glacial action in the first instance, when this high region was most probably, deeply overlaid by ice and snow, is a hazardous question, and one highly problematical. From the alternation of the beds of debris and finer deposits, we can infer that there have been milder and milder seasons than at present exist, back to colder and drier: during the first, beds would have been deposited by the increased transporting power that would have carried the materials further out into the lake, while at the same time the level of the waters would naturally have been much higher. Its waters must then generally have held much silt and mud in suspension to form the shell-beds already mentioned. At the present day no deposit of any kind is taking place, save perhaps near the debouchement of the Chushai and the extreme western tributaries.

A closer inspection, with some levelling, would, I think, somewhat clear up the mystery attached to the huge masses of alluvial deposits seen in the valleys of all the great rivers of the western Himalayas, from the Chang Chuen and Loh to Skardu, in the Valley of Kargyl and Valley of Dug, and on both the

Thelum and Chanasabagha (Chenal) rivers. Give a greater rainfall to the Pangong district, and a lower snow-line, now above 20,000 feet, and the ravines would be seen with fine running streams in them, and, allowing time, would cut through the barrier at the Surtokh La, and eventually down through the whole length of the aluvial deposits in this lake-basin: the large valley and its tributaries then drained would resemble most closely on either side the sand, shingle, and conglomerate deposits now seen at Tankse and on the now-dried rivers. These deposits at Oto would be somewhat higher, and would cover a greater area from the junction of the great tributary there. As a proof that the waters of the Pangong Lake in former times have fallen below its present level, I may state that on a long point of land in the little Bay of Marsook, in deep, very clear water, I looked down upon a terrace 10 feet below the surface, which terminated in a cliff, where the stratification of the sand and clay could be well seen; the bottom was not visible beyond this, and it was too far out to enable me, with my present means, to sound the depth. The only deduction to make from such comparatively recent changes is, that the level of its waters has been alternating with moist and dry periods of time the snow process of which may be even now going on almost imperceptibly to man. The water of the Pangong, depending, as it does, mainly on the winter snow, I ask, may not the snowfall in this part of the Himalayas be much less now than formerly, and the country passing through a period of diminishing falls? Slow as such changes may be, they are by no means improbable or impossible. From the mountain spurs having approached so close to the broad bed of the Kymagoo Tazzer, the absence of water, and it having also taken a bend, we had been led to imagine its course here ended; but thus we were both of us much surprised to find was not the case, for we now beheld ahead of us an enormous gravel-covered valley, stretching away to the foot of mountains at least 18 miles further to the eastward. This open valley had the most peculiar aspect of any I had yet seen, but partook in its dry gray, its bed a good deal of the nature of those valleys I had seen between Pul and the Kang Gang La; its elevation was about 16,400 feet, and its breadth in widest part about 2 miles, the ridge of hills bounding it to north lay to about 4 to 5 miles off, but were only 3000 feet above it, and the spurs came with a very gradual fall towards the valley. On the south a very low ridge of about 500 feet—in places not more than 500—separated this valley-plain from another broad one of a like character, the ravines of which ran up into the hills in wide beds, from 200 to 300 yards in breadth. Several broad lateral drainage-planes

also formed a junction with the one we were in, from the northern line of hills that run parallel with it.

In the foregoing pages reference has been made to the great accumulations of boulders, gravels (more or less angular), clays, and sands, near Lankse, and in the Ching Changmo; it is necessary to add a few words regarding the causes I assign to their formation. This I think clearly glacial. Proofs are not wanting that in ages past the valleys of the Himalaya contained glaciers of enormous length and thickness, the only types of which are to be seen in those now filling the valleys of the Karakoram, far north in Baltistan. About halfway between the villages of the Kungun and Gurd, lying on the Lang River (a tributary of the Jhelum), Kashmir, and at the village of Gurd itself, marks of glacial action are unmistakable in the deep grooves or struts cut in the hard metamorphic slates, at a height of 150 to 200 feet above the present level of the river. This point is 20 miles in a direct line from the head of the valley, where at present some very small glaciers exist. How much further this glacier extended towards the plain of the Kashmir Valley it is impossible to say, but at the detachment, 10 miles below, thick beds of debris are to be seen. The Sind River is still of very considerable size, and glacial accumulations are very soon swept away, as may be seen in the now existing large glaciers below their terminal cliffs. Taking 5500 feet as the lowest limit of its extension, every valley in the vicinity of a range equal in mean altitude to the mountains north of Kashmir, must have been once the bed of these moving rivers of ice. The indication of glacier extension are also seen on the north of the Zogi Lai, between the present glacier of Muchoi and Pindras, at 10 miles from the pass. It is my belief that the Dras plain was once buried in ice, and that this region presented much the same appearance that the neighbourhood of the Mustakh does now. The imagination can hardly conceive the enormous magnitude that glaciers like those in the Karakoram must have once attained, and that they extend so into the Siachen Valley on the Indus; 70 to 80 miles is by no means improbable. Smaller ones from the ridge to the south we know of: for near Kaptan, a fine mass of moraine protrudes into the plain nearly a quarter of a mile, having very large angular blocks on its surface. Moreover, this moraine must have been formed after the valley around Skardu had assumed somewhat its present configuration, for this basin has at some period been filled up with beds of lacustrine deposit, gravels, and conglomerates, to a height that overtops the present schistose rock rising above the town, the corrie basin being the highest in the series; but it is quite natural to suppose that on a milder climate succeeding,

these larger alluvial deposits would be the first to be removed by the extinction of glaciers further down the valley, while the cold was yet intense enough to preserve those around and above Skardo. Though the vast accumulations of *detritus* in the Skardo basin were, I conceive, due to the glaciers from the high ranges both to the north and south of the Indus near Basar, which glaciers must have extended close down to and dammed up the river, it does not follow, as some might be led to suppose, that the whole mass of such a mighty barrier should be formed of ice. It was the *débris* or moraines that would have composed this, from its continued accumulation in so narrow a gorge as the Indus there presents. These exuvie piled up would have raised the bed of the gorge, and the bed of the lateral valley as well also elevating the active cause, viz., the glacier itself; and in course of time the whole valley level would have been brought up to the height of the great deposits around Skardo. Innumerable other instances can be seen of in-action throughout the Kashmir territory. I will instance near the Potho La, on road to Leh, a spot now far removed from such causes in action. Even in the valley of the Jhelum, below Dara Mula, the effects of a glacial period can be seen. That glaciers, along lateral ravines, have extended across the main valleys at some period of their existence is most probable; and in nearly every case where gravel deposits are seen, some side ravine below, having its sources high up, can be pointed out, whose glacier has formed a temporary stoppage to the main river into which it ran; and such effects are still in progress in the highest ranges of the mighty Himalayas. When glaciers extended down to 5000 feet, what must have been the appearance of the Upper Shiyok Indus and Chang Chingmo, where 12,00 to 13,00 is the lowest level of the country? Contemplation of such a condition renders the formation of lakes and the accumulations of detrital matter a natural sequence, very easy to imagine. Further, when such powerful forces of ice and water were in action, their results would have extended far down the main-drainage lines, and are to be sought for at the confluence of such rivers as the Indus, the Sutlej, Ganges, &c., and I believe that the more recent accumulations of immense boulder-beds composed of rocks from the inner ranges, such as may be seen in the Neen Nuldee, Deyrah Dhoon, and other places along the base of the Himalayas, may owe their existence to a glacial period in these mountains.

In the lower lake there is not a vestige of any sort or kind of plant. The beautifully blue clear water washes a bank of sand and pebbles, the latter perfectly free from algae. This is not the case beyond Ote, where the water is much less salt;

there the stones under water are extremely slippery, and covered with vegetable growth. At this part, also, patches of a coarse water-weed are also seen here and there along the shore, but not growing luxuriantly, and evidently making a struggle for existence. The waters of the western end are far more salt than those of that near Ote, noticeable even to the taste, but it is not until the stream that connects the two portions is fairly entered that it is by any means drinkable, therefore for the whole distance eastward we used to take water, save when we had the luck to find a spring of really fresh. By looking out carefully we discovered springs in three places flowing out from under the bank, and in one spot these springs were bubbling up for some distance out into the lake, rendering the water quite fresh around; and it was quite a pleasure to see the poor vass, who carried our baggage, take a fill of it, when for three days they had drunk nothing but salt water. A curious feature of the Pangong is the almost entire absence of streams whose waters find an exit in it, considering the great area that some of them drain; for, with the exception of the few glacial rills and the Chushal stream on its south shore, and the stream at the extreme west end, from the Marse Mik La, there are none. The northern shore is particularly dry, not a single rill joins it for its entire distance until arriving at "Pal," on the upper lake; and the same may be said of the southern shore, from the Chushal River to Ote, and for many miles beyond. Many of the ravines have their sources at a considerable distance, but near the lake have broad dry beds from 200 to 300, and up to 500 yards in breadth of rubble and sands. I may instance the very large lateral ravine at Ote, the largest branch of which runs back into the snowy mountains of Chang Chingma for a distance of 40 miles, draining together an area of nearly 400 square miles. The silt, which in former times has been carried down from the above area, has formed the plain of Ote, the broad barrier to what would otherwise be a continuous large reach of water. This was no doubt the old configuration of the lake, for a rise of some 12 feet would cover the greater part of the Ote plain over now. In nearly all the higher ravines water is plentiful, and glaciers of the second order are seen, but the streams are all scooped up in the broad bed of the main valley, which acts like a perfect sponge: the stream breaks out occasionally here and there only to hide itself a few hundred yards down; the last water seen being above the fort of "Labak-khar," but it nowhere is seen to flow into the lake, being lost in the sands of the plain.

The western end of the Pangong Tso La, as near as possible, is latitude 34° and longitude 78° 30', thence its direction is due

south-east to latitude $33^{\circ} 40'$; it then takes a bend easterly, and follows that latitude as far as Noh, in longitude $79^{\circ} 50'$. The mountains to the north-west of the first long reach are of the great apparent elevation. In July there was very little snow to be seen, and only on the very highest portion, or the main range which, nevertheless, is from 18,000 to 19,500 feet high; the highest peaks being 20,000; but the level of the lake being 13,931 feet above the sea, detracts considerably from their altitude. The terminal knobs of the spurs from the above range lie close on the edge of the lake, rising to the height of 600 to 1500 feet, generally terminating precipitously; and the lakes, I should imagine, is excessively deep in such places. It would be a most interesting scientific enquiry to sound, with the aid of some portable kind of boat, the depth of this lake. To the south-west a high range runs parallel to the lake, some of the peaks on which attain an altitude of 21,500 feet; this range terminates in a peak above, and to the east-south-east of Tunkaë, which is 20,003 feet.

The above fine line of mountains, covered as they are with perpetual snow, and their ravines terminating above in small glaciers, form a fine boundary to this valley on the south. The southern watershed follows the lake very closely as far as Ote. It there extends further south, and between that place and Pal several very large lateral ravines descend into it, all with the usual broad, dry, gravelly beds; the largest of these are the Angrong, Tengun, Kun-Sarpo, Lomlung, &c. valleys. On the northern shore, beyond the very large valley of Chang-Barmah, which finds its exit at the Ote plain, there is another, the Dal-Lomda, that drains the considerable tract of 150 square miles; the silt carried down from this has narrowed the lake very much, forming a low point jutting out into it, and has contracted the waters to a quarter of a mile in breadth. Altogether the mean breadth of the second lake, "Tso Nyak," or "Middle Lake," is much less than the first or true "Pangong." Wherever a tributary ravine joins the shore there is grass, scanty, as a rule, and of a very coarse kind. At Ote it is much richer, especially in the vicinity of the stream that unites the two lakes. On both banks of the second lake wood is found in plenty, growing luxuriantly in places. At Angrong and Nun-kum it formed a scrubby jungle; but on the northern shore, at Siling, it was met with no more, and the only fuel was a stunted plant, which throws out a good deal of woody root, and is found all over the country; and I never found a scarcity of it even up to 18,000 feet in the Chang Chungmo, save where the ravines were very rocky. Descending from the small ridge between Pajung and Pal, the extensive plain near the latter

comes in view, bounded by low spurs on every side, save the east, where a conspicuous peak rears its head; a small stream winds its way through the eastern side of the "Mandan," and joins the lake, being the only one on the northern shore that does so.

Three and a half miles beyond Pal the second lake ends, and a small stream is found flowing into it through half-a-mile of sandy flat ground, beyond which is another lake, called *Tso Run*, having a length of about four miles, after crossing again some flat ground, Lake *Tso Nyak* (the second) is reached, connected, as before described, with *Tso Run* below. Near the northern shore of this last is situated the small village of *Noh*, a short distance up a tributary from the north. This place I much wished to visit, but could not manage to accomplish it. On the northern shore of *Tso Nyak*, at intervals, a ridge of sand and earth runs parallel to the line of beach; at first I attributed this to the action of waves, but observing the large proportions of these banks in some situations, and at last seeing the ridge quite 6 feet high, and, moreover, that the bank had been fairly turned up, as if with a gigantic plough, I was puzzled to account for such an appearance; and on questioning the guides, they learnt that during winter, when the lake is frozen over hard, the water naturally accumulates under the ice, and, flowing westward, can find no exit. When the pressure becomes too great it tears up the frozen earth on the shore, and, liberated, flows over the surface of the ice. I gave a short sketch of a section through one of these banks, showing the old surface grass still growing on the perpendicular face of the upheaved ground, which, of course, is on the inland side. On measuring this I found it an inch or two over 6 feet. I noticed, also, that the banks were higher and better developed on the western curves of the bays. During summer, evaporation, no doubt, carries off a great amount of the surplus water that drains into it, but in the winter this must cease, and, with its upper casing of ice, the water, to free itself, tears and rears up the banks in the curious manner above detailed. During the whole time I spent on the shores of the Pangong, the only animal I saw was the *kyang*, or wild ass of Tibet; a few couples of these were grazing on the grassy maidans of the northern shore. Of the birds, geese were plentiful in the stream between the first and second lakes, and I saw many young broods. The *Brahmini* geese, too, a red-headed diver with white body, and a very black plumaged duck, made up the water-birds.

There was a great scarcity of smaller birds; a sand-piper and wag-tail were occasionally seen on the shore. The large fish-

eagle was plentiful at Ote, attracted there by the fish which are seen for the first time in the slightly brackish water, flowing out of the upper lake; this lake is full of them, they much resemble the tench in shape and colour, only somewhat longer in the body, and are covered with slime like those fish. I had fortunately brought a rod, and had near Nura Kuni, in deep water under the rocks, a very good afternoon's sport, catching some five-and-twenty; they ran about a pound in weight—the largest I caught being about 4 lbs. These fish formed a welcome addition to our food as long as we remained on the lake. I supplied my old Bhut Moonshine and some of the guard with hooks and lines. They became fierce fishermen, and brought in good bags. It is a fine sight to see the lake during a storm, when a good strong wind is blowing down a long extent of its surface, and dashing the waves, which rise to a considerable height, against the hard rocky shore. I had the fortune to see its surface in this state one morning; and sitting down, watched the waves rolling in, and Pangong waves brought up thoughts of beaches in old England. Though the country is so barren, the lake has its beauties in the varied tints of surrounding hills and mountains, and the rich deep blue of its waters, becoming quite of an emerald-green colour as they shallow near the shore. During the summer months the lake is quite deserted, and we did not fall in with a soul the whole distance up to Pal, or we might not have got so far. At that time of year the flocks of shawl-wool goats, sheep, and yaks, are grazed in the higher valleys on the young rich grass that springs up in some places after the snow has left the ground. During winter they are brought down to the level "mudans" near the lake, and Ote. I was told, becomes dotted with black "Champa" encampments. Snow, they say, never lies long at Ote, though the lake freezes all over very thick, and the degree of cold must be very considerable. The Champas or Chingpas, who spend the winter on the lake at Ote, come from both Noh and Kaskok. The said plain is a disputed piece of ground, the men of the Pangong district claim it; though, judging by the site of an old fort standing on a low rock on the north-western side of the plain, I should say it undoubtedly belongs to the Shazean authorities, by whom it was built years ago: proximity of Leh and greater part of the Thanadar there, places it in the Kashmir Rajah's territory. Walls of stone and earth are built up as a protection for the tents against the wind, and, to render them still snugger, I observed that the interior floor of their huts had been dug down to a depth of 3 feet, which must make them warm abodes.

I found the summer winds of this country cold enough.

What the winters are like I can well imagine. The amount of comfort in a tent, on the edge of a frozen sheet of water stretching for miles, must be a very minus quantity. During the whole period of my sojourn there in August, 1863, the weather, with a few solitary fine days, was miserably cold,—nothing but cloud, sleet, and rain. I may have seen it under disadvantageous circumstances, and I trust at times it does enjoy a little warmth and brightness. On the 1st of August we reached Paljag, and in the afternoon of that day came in sight of the first natives we had seen, viz., three men driving some yaks in our direction. They saw us at the same time, and turned and bolted: we followed, but failed to overtake them, it being about two miles to the point they had rounded. They had disappeared up some lateral ravine out of sight; our approach was, therefore, known to the Rudok men. It rained in torrents during the night. Camp was pitched at Pa-jang, where a long broad mule-bed came down to the lake, and a long narrow one ran from the hills on the north out into it.

Our road next day, on towards Pal, lay over this, it being a very long round to follow the shore or ter the cliffs. From the low pass the broad dull green plain of Pal was seen, and on its western side we discovered the black tents of a small Tartar camp. As our approach was now certainly known to these people, we bent our steps there. Three men came out to meet us, and turned out very mild individuals, one being a Llama or priest. Their dogs, of the large Tibetan breed, were most noisy and furious at the intrusion of strangers, and were not to be reconciled until long after the tents were put up. These Changpas informed me that one of their number was about to ride into Nshat-sing, to give the news of our arrival and have it thence sent on to Rudok. I instantly set my Lhat Moonshie down to write a letter to the governor of the place requesting that he would cause no difficulty to my paying a visit to the place, and see its monasteries. The next two days I remained at Pal, for the hills were buried in dense cloud, and a good deal of rain fell, so that I was unable to proceed with my survey work in an eastern direction; on the third day the Zimskang of Rudok rode in with some twenty followers and pitched his tents on the other bank of the little stream, and came over at once to see me. He was a native of Lhasa, a short, stout, jovial fellow, and brought a letter from the Governor of Rudok, and a white scarf, together with a present of two damruks (bricks) of tea, and some sheep and goats for my men. The letter was then read by the Moonshie, and was to the effect that it was not in his power to give me leave to visit Rudok, as he had strict orders from his superiors in Lhasa to

prevent foreigners crossing the frontier, and that it would eventually be known if he permitted it. He asked that he could not use force to prevent my further progress; but he trusted I would not lose him his appointment by so doing, and that I would accept the presents as a sign of friendship. Having received orders not to bring on any collision with the Chinese officials, I had to give up the idea of seeing Rudok, but I held out for one more march towards the place, and gained my point, but not before showing some anger at their absurd wishes.

The Zimskang again came over, after my dinner, about 9 o'clock at night, to beg I would not proceed any further; but I said they must abide by their first agreement. The afternoon of that day I was enabled to ascend the limestone mountain, east of camp, and fix my true position: the range around Rudok, and the eastern end of the lake, were also again visible, and I was enabled to get intersections with other rays. The 5th broke, fortunately, clear and bright, so I started early along the shore of the lake in direction of Noh, my friend the Zimskang stuck to me like a leech, the whole day, with a few of his men; and a curiously dressed rabble they were, with their enormous flat mushroom-shaped hats, and all mounted on little shaggy, but sturdy ponies. They were all very jolly and amiable. I made no secret of my work, and showed and explained the map of the lake to him, which he thoroughly understood. I have found the people of Tibet far in advance of those of Hindustan as regards drawings, and what they are meant to represent. At a small hill called Toba Nokpa—whence I had promised to return the previous day—I fulfilled my agreement, evidently to the great pleasure of the Zimskang, who was now more pleasant than ever, and thanked me with many *suzams*. On the 6th August my tents were struck to leave Pal, and the Rudok men did the same. I was invited over to their tents previous to starting, to partake of a purring cup of salted tea, churned with butter, which is always kept simmering on the fire; it is by no means a bad beverage when made with good fresh butter. I gave him a few presents and we parted. At the eastern end of the Pangong the hills somewhat decrease in altitude, the highest lying to the north of Noh. Looking in a direction due east from the higher points I ascended, the country appeared flat but undulating, and I observed in the far distance two or three pieces of water; these may turn out to be connected with Pangong Tso, probably bounded by steep sides, which were not discernible at twenty miles, they may extend for some distance; the breadth of this high region was considerable, and extended up to a snowy

reuter, but missed them. A fine mass of hill rose to the south. Approaching easy and near, I sent the camp on to the stream below, and commenced the ascent; this was a good deal steeper and further than I had anticipated, proving to be 20,240 feet high.

The labour was rewarded, for from the summit I obtained a splendid view, and did a large amount of work; massive snow-caps still covered the top, and the wind was bitterly cold. The mountains to the south of the Pangong were well seen, with the great snowy range near the Indus beyond Rudek; and I still hoped to go on in that direction. Up the mountains to the east and west, there was a fine view—of a country, bleak, naked, stark, and inhospitable. Only in a tributary of the great Chang river—a Lomah—whence was a way to Oie—was anything green; a little grass and turge there skirted the stream. Work being finished we were soon down again. It was a bitter cold evening, but the camp was in as sheltered a spot as we could find, there was some good grass here for the yaks. The valley in which the camp took the usual configuration, and ran towards the west, with a bed about one-fourth of a mile broad; at about 10 miles we reached the confluence of a large valley from the north, and up this I determined to proceed, and thence to Kapsang trigonometrical station. Several lakes were here seen, and up the valley numerous Tibetan antelope were wandering up the gravelly wide hill or five miles—where a tributary turned to the east and ended in an extensive plain, on the surface of which lay some large snow-beds. Rather than a loss of bad water. I took the eastern branch, the yaks and servants proceeded up the western (the Lomah), towards a patch of green grass, where I thought would be found, and this proved to be the case. From the summit on the top of Kapsang was visible, and a very fine view of the plain below it looked. I followed the eastern branch, a low pass, which overlooked a narrow gorge that terminated at a way down on another high level plain. There was no kind to be seen here, and my guides told me that the country on beyond was grazed over by a nomad tribe, who did not own allegiance to the Rudek, but that they were great thieves and robbers, and were known to Tinkse to exchange their wool for grain, of which they had none. These are the people who wander over the hills to Hela, and into a terra incognita on the

late that I got back to camp, going to bed at a stiff ascent next day. I was up and at work in an hour it was very cold, the water of the lake was frozen, and the backs of the yaks were quite

extended over the greater part of the area. Scattered plants of rhubarb are here seen, but very tough and sour. The rocks were all of limestone formation, with a strike nearly east and west. I found no fossils; but it resembled in appearance the Palæozoic rocks of Dms, &c. I obtained from the peak a fine view, but could see no more of the eastern end of the Pangong near Noh, on account of a dense haze in that direction. I was much disappointed, and could only fix a peak or two looming up through the mist. My own camp and the Tartars had gone on, and I quickly followed them down the valley. This was very characteristic of these regions, spreading out into a broad, gravelly plain, on the left side of which was a sharply-defined escarp, showing its general level had been uniform. This plain formed the base of one of the branches of the Dal Loomba.

We parted with our Champa friends at a place called Caulpon, where they encamped to graze their goats and sheep for a few days, while we proceeded on along the side of the hills of the right bank, rising gradually to a low pass called Pa Luen, and descending on the other side to another tributary of the Dal Loomba, which at this spot branched into three broad arms that penetrated into the mountains on the north for some eight miles. The longest of these valleys had a direction north-west, and up this our road to the Chang Changmo ran; no water was here to be found, and it was not until we had proceeded another two miles that water was found in the bed of the ravine. Where we halted fuel grew in plenty—the yellow-flowered Tibetan furze, differing slightly from the European in not being quite so thorny. The valley was still broad, but the hillsides descended into it with steeper slopes; it was here called Drukser. When on the Sa Lam, a horseman was seen riding down the valley from the north, who joined us; he had come from an encampment up the valley, and said he was sent to escort us on to the pass ahead. Our movements were therefore well known, though we should not have supposed a human being to have been within miles; but the Champas were evidently on the watch, and espied us the moment we topped the pass of Sa Lam. Between camp and the Dzenjer La the valley bore the same character, save that the broad gravelly bed was covered with a luxuriant growth of furze, this swarmed with hares, which got up in all directions, and I had some good shooting. The Dzenjer La was reached about 10 o'clock; I found it by boiling-point thermometer to be 17,465. The rise was gentle the whole way, and led in like manner into the valley on the north. As I came up to the usual pile of stones on the crest, two fine *Arceuthobium* came round a spur to the right, at about 200 yards' distance. I managed to get a little

me. He had been searching for the pass by which M. Seldang-tweit had crossed towards He-ri; but the natives with him (for he could not speak Hindustani) had brought him in this direction, quite a contrary point of the compass. The valley ahead of us appeared to end at about six miles distant, and thus it had been sketched in on the rough reconnaissance I had; so the next morning it was determined to leave the camp where it stood, and go on ourselves to the main ridge of the valley and return by evening. Plenty of woody rooted willowen her, or rather a stunted plant with the like scent, grew around, but grass was very scanty—only in two or three spots was found barely sufficient for the yaks. A few large patches of snow still lay on the ground; these (for the hillsides were now quite bare of it) were the remains of deep drifts formed by the winter winds. I could not spare time to proceed any farther: I had much work to finish in the rear, and some high points to ascend which the early snowfalls would shut up for the season. I much longed to explore, but could not do so. Mr. Turner went on beyond for two days, and gave me afterwards a sketch of the ground. It appeared that for some ten miles farther the open valley turned sharp south, and disclosed a long piece of water like the Pangong, but the mountains shut out the end of it: nor did he ever get so far as the edge, to tell me whether it was fresh or salt, so this may be, for all we know, another rival to the great Pangong Tso. Turner saw six or seven miles of its waters, which he described as having a breadth nearly equal to that of the above lake.

Fine agates and cornelian are to be found in a small mine, at the spot where the long southern spur from Chankang H. S. abuts on the Kyanggo fraggar. I made a short ascent here, in order to obtain an extensive view over the country to the south-east. This presented the appearance of large, broad, level valleys, that might almost come under the designation of plains, the undulating ridges that divided them being of so little elevation. On the 10th August I encamped close to the hot springs of Kym. These rise at the foot of the hills on the left bank. The alluvial plateau on the edge of which they are situated extends for about half a mile to the river, and ends in a low cliff. The water rises in several spots, covering a distance of about 150 yards long. The spring on the extreme west side is largest, and its temperature the highest. The ground about is wet and swampy. From the north-west a large tributary here joins the Chang Changmo River, adding so much to the depth of its waters that it was a matter of difficulty crossing at the two fords below Kym. The valley now lessened much in breadth, but the alluvial deposits were still well developed and were cut into

a series of steps by the gradual falling of the lake, or the diminished waters of the river, or a drier climate commencing.

In the Gedmure Loomba was a green expanse of grass, with a rather severe ascent to a grazing spot called Boomzi; from this a high broad plateau extended to the pass, the line of watershed being so broad that it was difficult to assign its exact position. The high wide valley parted north and south, in first direction to the Ororotze La, 18,050 feet, only used by shepherds when taking flocks to graze in the lower courses of the Chang Chũngmo River.

I had now finished the whole of my work, and went on as far as Muglib, thence to Tangsè, where I paid my coolies: the men behaved very well; never had I any occasion to be put out by them. I returned to the Indus Valley over the mountains by the way of Kay La, 18,256 feet. The Kay Loomba River is fringed with grass and bushes for a considerable distance up, and at a height of 16,300 feet flows out of a lake about 400 to 500 yards long, of a very deep clear water. It owes its origin to a large landslip from the left side of the ravine, by which cause a very considerable portion of the hill-side has moved forward and been disrupted. The rock is granitoid, the same as the Chang La, and forms the main axis of the mountain-chain between the Indus and Shayok. From the lake to the pass the scenery was as wild as could be; near its source the ravine turned south, and was nearly level for some distance, ending amid a mass of scattered rocks, débris, and snow; large beds of which still filled the ravines and lay in patches on the summit of the ridge. The wind blew with great violence from the W.S.W., on reaching the pass, with that cutting, piercing, unsparing manner it does at these elevations. Behind the shelter of the rocks I boiled the thermometers, and then descended into the valley below.

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